MEYRA®

The Motivation.

ELECTRONIC WHEELCHAIR

GB

ELECTRONIC WHEELCHAIR

OPTIMUS

SERVICE MANUAL

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FOREWORD

This service manual is designated for the authorized dealer.

It is complemented with the according users manual and the spare parts list. – A users manual is supplied with each vehicle. Spare parts lists and operating manuals can be ordered at the manufacturer.

The work may only be done by professionally educated personnel.

TECHNICAL SPECIFICATIONS

The indicated performance is only realistic under the following circumstances:

- Surrounding temperature 27° C
- 100% nominal battery capacity in accordance with DIN standard
- Mint condition batteries with more than 5 charging cycles
- Nominal load of 75 kg
- Without repeated acceleration
- Level and firm surface

OPTIMUS

Model 3.622 (fig. 1–1 and 1–2)

Electronic .....110 A
Batteries:
– Gel batteries..... 60 Ah (20h), 80 Ah (20h)
– Lead acid batteries ..... 60 Ah (5h), 90 Ah (5h)
Battery charger
Main fuse .....80 A
Permissible rising/falling gradient: 18%

Motor:
– Constant performance 6 km/h .....300 W
– Constant performance 10 km/h .....500 W

Range:
– with 60-Ah-gel-batteries (6 km/h) ..... 40 km
– with 80-Ah-gel-batteries (6 km/h) ..... 60 km
– with 80-Ah-gel-batteries (10 km/h) ..... 40 km
– with 60-Ah-lead-acid-batteries (6 km/h) ..... 50 km
– with 90-Ah-lead-acid-batteries (6 km/h) ..... 70 km
– with 90-Ah-lead-acid-batteries (10 km/h) ..... 50 km

Speed:
– serial..... 6 km/h
– optional ..... 10 km/h

1–1

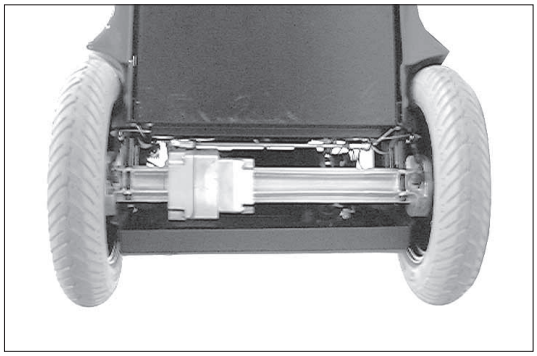
1–2

☞ **Note:**
Tighten all screwed connections, when not specially declared, according to table *torque according to DIN for screwed connections,* view chapter < *Maintenance/Maintenance checklist/DIN norms and guidelines* >.

DRIVE UNIT

The drive unit (fig. 2–1) consists of

– the motor (24V-permanent magnet direct current motor, fig. 2–2/ A),
– the magnetic brake (electromagnetic spring pressure brake, fig. 2–2/ B),
– the maintenance free direct cogged differential gear (fig. 2–2/ C) including the two half axles
– and the drum brakes on both sides (optional, fig. 2–2/ D).



2–1

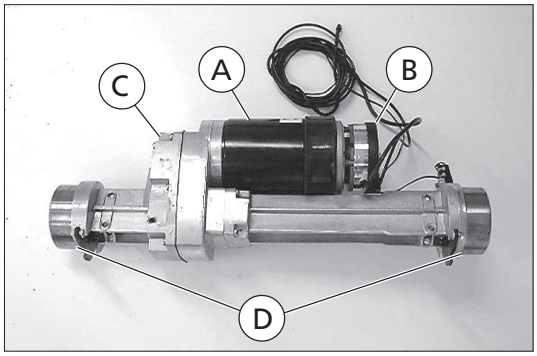
CARBON BRUSHES

When the motor is not running flawless and defects in the incoming lines can be excluded the four carbon brushes have to be checked one after the other.

REMOVAL

☞ **Note:**
Watch for the screws. – Will be re-used!

– Switch the vehicle off.
– Remove the plus cable and the minus cable from the motor.
– Remove the plus cable and the minus cable from the motor.
– Pull back the rubber lid (fig. 2–3/ E) from the motor.
– Remove the fixation screw (fig. 2–4/ F) from the carbon brush retainer (fig. 2–4/ G).
– Push the carbon brush retainer in the direction of the screw hole (fig. 2–5).
– Slightly pull the carbon brush retainer back form the motor opposite of the screw holder.
– Press the carbon brush retainer in the opposite direction of the screw hole (fig. 2–6).



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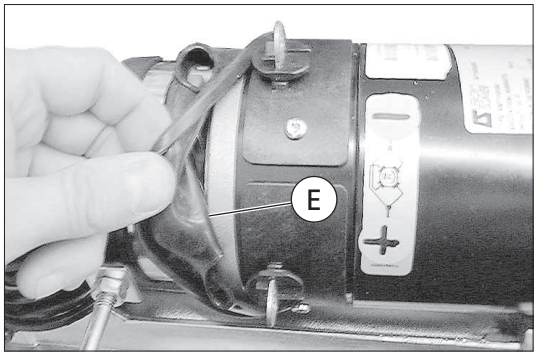

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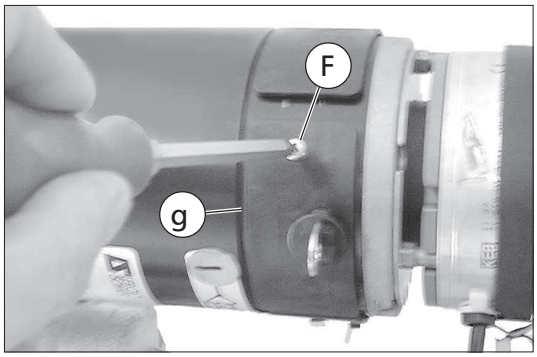

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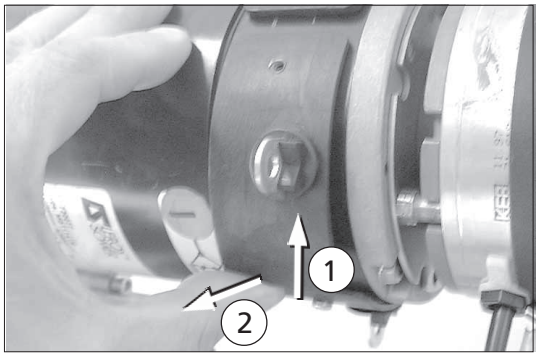


2–5

– Slightly pull out the carbon brush retainer (fig. 2–7).

☞ **Note:**
Two opposite carbon brushes each are connected to each other by a cable (fig. 2–8/ H) running inside the motor.

– Remove the philister head screw (fig. 2–9/ I) of the connecting cable.

– Completely remove the carbon brush retainer.

☞ **Note:**
1.) The carbon brush retainers cannot be pulled straight out of the opening. – Slightly turn the carbon brush retainer sideways while pulling it out.

☞ The carbon brushes are worn when the pressure springs come to rest on the retainer without the carbon brushes reaching over their guide way. They are also to be replaced when contacts (fig. 2–10/ K) appear black and blunt. – On intact carbon brushes the contacts are anthracite coloured and shining.

☞ When one or more carbon brushes are extremely or totally worn, all carbon brushes are to be exchanged. – As a spare part the carbon brushes are supplied in a set completely assembled in the retainer.

– If the carbon brush is completely intact reassemble the carbon brush retainer and check the next one.

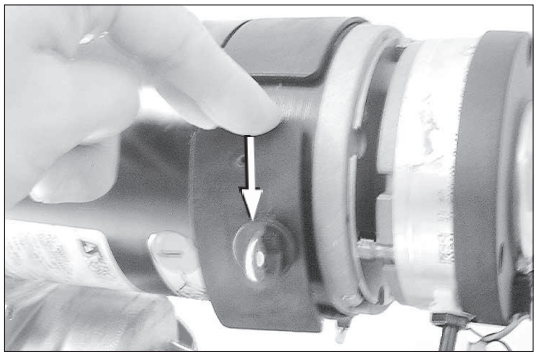
FITTING

The fitting is done analogue in reverse order.

COLLECTOR

The collector (fig. 2–10/ L) located between the carbon brushes is also to be checked for damages. – To check them remove a carbon brush retainer.

☞ **Note:**
The slight grinding marks caused by the carbon brushes correspond to their normal wear and have no influence on the performance of the motor. Extreme recesses have to be smoothed out. If partial segments have been broken out or are extremely burnt the drive unit has to be replaced.



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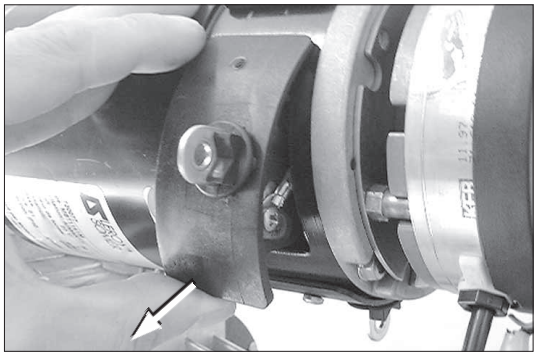
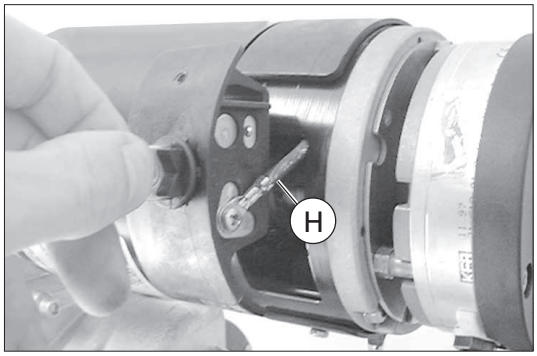


2–7



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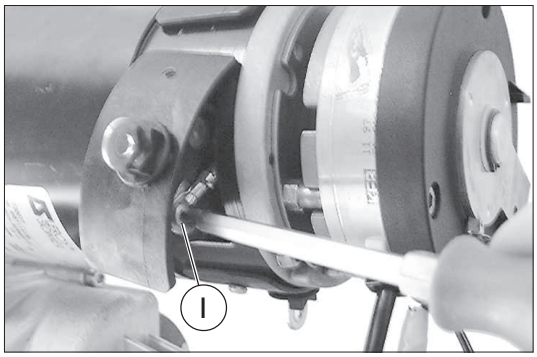
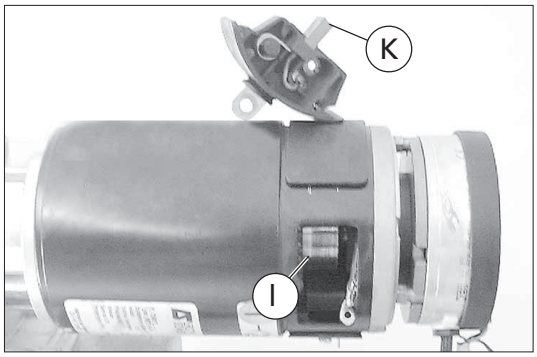


2–9



2–10

REPLACING THE DRIVE UNIT

The drive unit (fig. 2–11) can only be replaced as a complete driving unit (with the exception of the magnetic brakes).

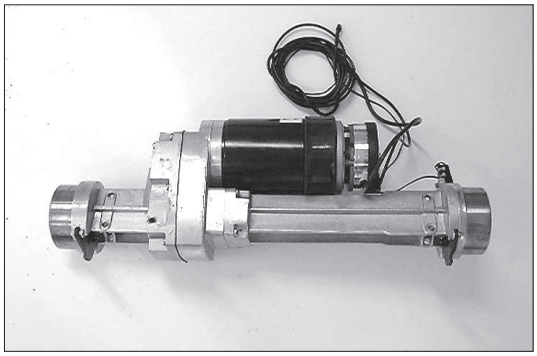
PREPARATIONS

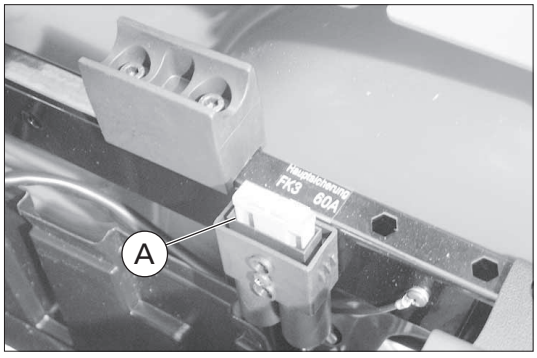
– Jack up the vehicle under the battery case so that the front wheels move freely.
– Swivel the seat up.
– Pull the battery fuse (fig. 2–12/ A) out of the fuse holder.
– Remove the pole shoe covers from the battery poles.
– Disconnect all four cable connections from the battery poles (fig. 2–13/ B).
– Prevent the seat from swivelling down (for example with a wood strip between the seat and chassis).

☞ **Note:**
Slight tension can occur on wheelchairs with seat inclination adjustment (Code 118) of the seat lowered completely. – Adjust to a tension free position.

– Carefully turn the button (fig. 2–14/ C) off of the seat lock without pulling on it. In doing so hold onto the pin of the seating lock (fig. 2–14/ D), onto which the button is applied, with a pan head screwdriver.

Attention:
! Only turn off the button with added security. – In unsecured state the seat will fall down when the button is moved. – Danger of injury!


2–11



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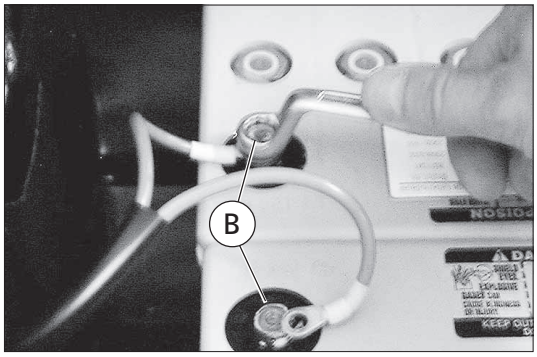
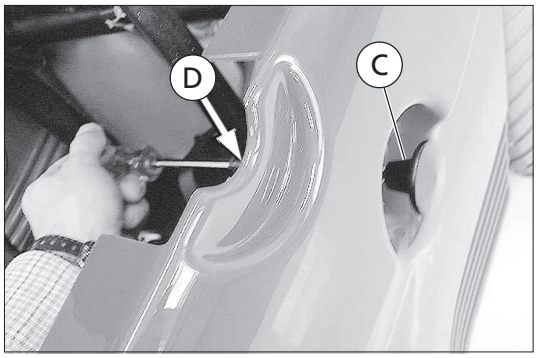


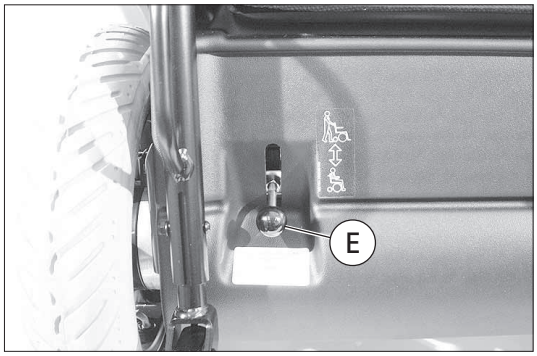
2–13



2–14

With drum brake option

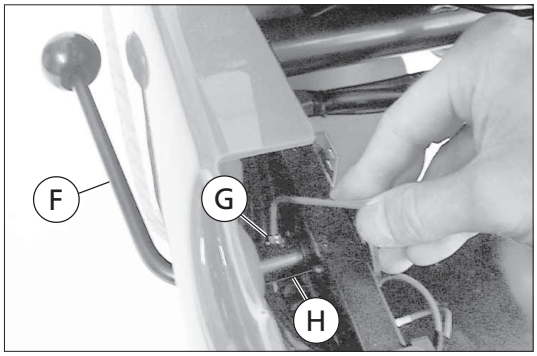
– Screw off the ball button of the drive-/push- operation selection lever (fig. 2–15/ E).
– Pull the brake lever (fig. 2–16/ F) off. – To achieve this remove the hexagon socket thread pin (fig. 2–16/ G) from the bushing into which the eccentric reaches (fig. 2–16/ H).
– Remove the bowden cables on both sides from the brake arms, view chapter < *drum brakes* >.



2–15

Without drum brake option

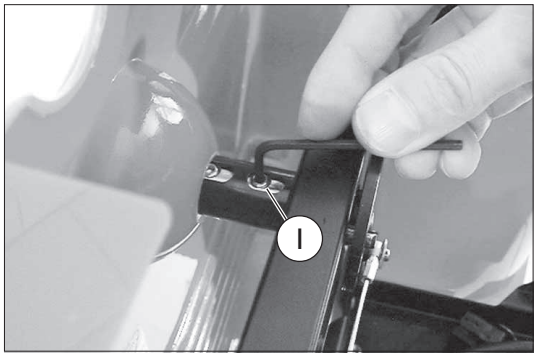
– Pull the brake lever off. – To achieve this screw the inner hexagon socket thread pin (fig. 2–17/ I) out of the eccentric shaft.
– Disengage the bowden cable from the motor and the magnetic brake, view chapter < *magnetic brake* >.



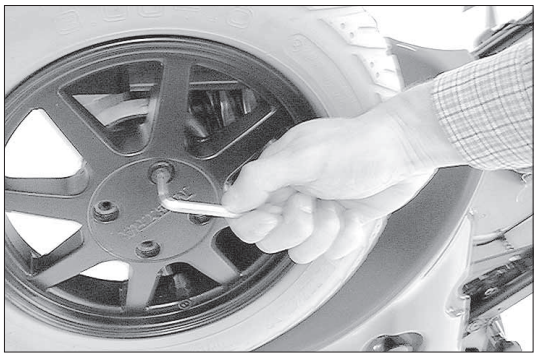
2–16

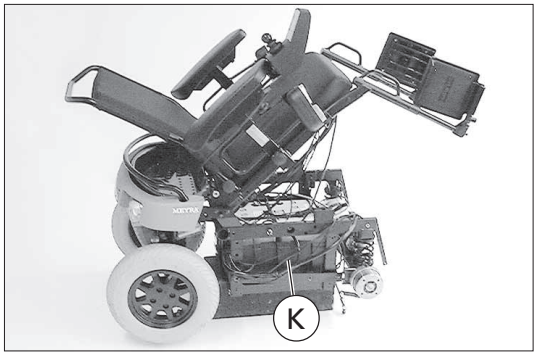
REMOVAL

– Demount the two front wheels. – For this remove the four screws for the wheel attachment (view fig. 2–18).
– Take the front and both side panels off (fig. 2–19).
– Loosen the spanning belt that straps the batteries in (view chapter < *batteries/replacement* >) and remove the batteries.
– Lift out the battery case (fig. 2–19/ K).



2–17


2–18



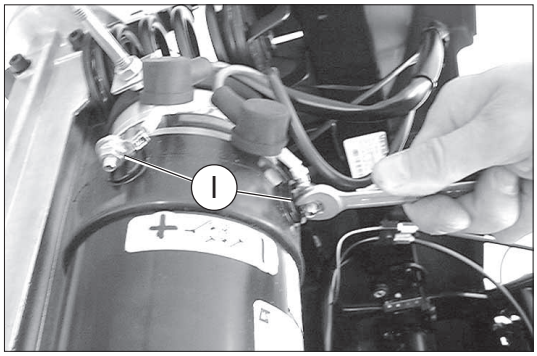
2–19

– Remove the cable connections for the plus and minus pole on the motor (fig. 2–20/ L).
– Open all cable binders of the right cable harness. Cut through any binders that cannot be opened (view fig. 2–21).
– Unlock the plug connectors of the speed sensor, the magnetic brake and the micro-switch for push modus, remove them from the power module and extract the cable harness. – To unlock the locking levers press them down on the opposite side of the module.
– Lever off the ball ladle of the transverse control arm after removing the security hanger (fig. 2–22/ M).
– Screw the stopper discs (fig. 2–23/ N) off of the rocker. – While doing so observe the following danger indications!

Attention:

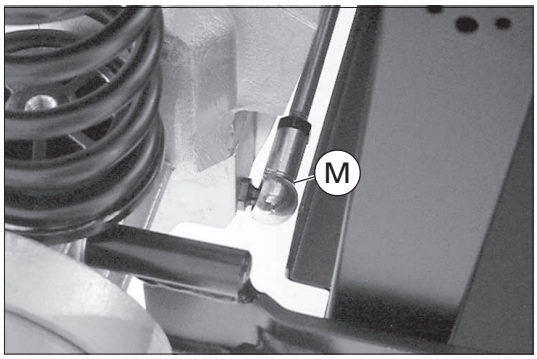
! When removing the stopper discs hold on to the drive so that it cannot fall down (view fig. 2–24). After removing the stopper discs slowly lower the drive.

– Remove the springs (fig. 2–26/ O) as well as the lower spring guides (fig. 2–26/ P).
– Screw off the screws for the attachment of the drive (fig. 2–25/ Q). – While doing so secure the drive against falling down.
– Remove the drive unit



2–20

2–21



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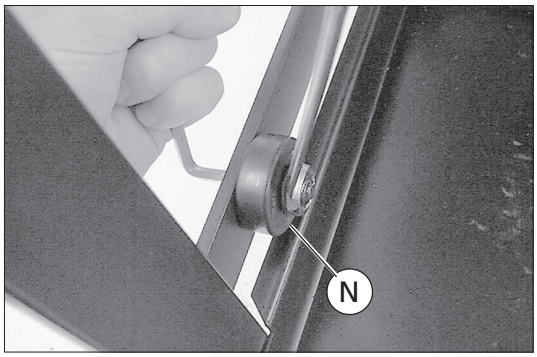
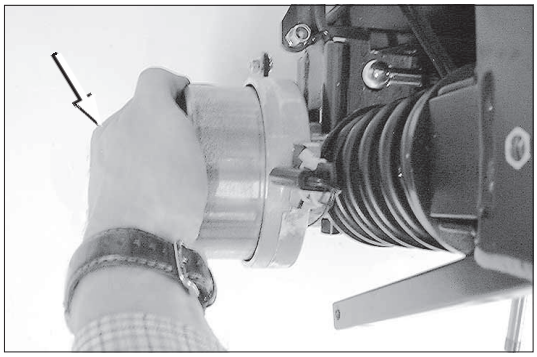


2–23


2–24

FITTING

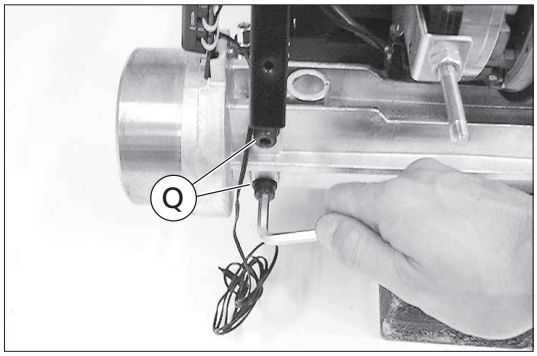
The fitting is done analogue in reverse order.

Attention:
! Secure the screws for attaching the drive unit (fig. 2–26/ R) with Loctite 243!

☞ **Note:**
The cable harness has to be repositioned. Guide the cable in font of the resting plate (fig. 2–26/ S) and underneath the shaft for the brake lever (also compare fig. 2–17 and 2–21). Afterward refasten the cable harness to chassis and sea again with cable binders.

Torque indication:
Tighten the screws for the wheel attachment with 20 Nm!

☞ **Note:**
After completion of all assembly work the drum brake has to be adjusted, view chapter < *drum brake/ adjustment* >.



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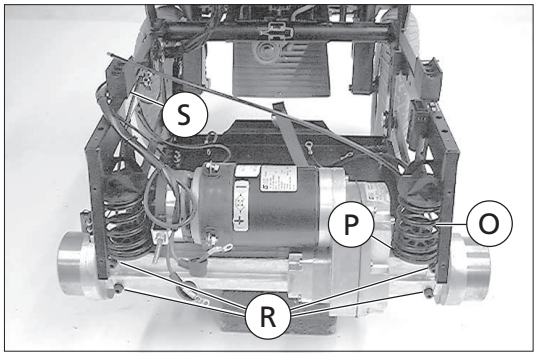


2–26

FUNCTIONAL CHECKS

Inspection during standstill

- Check all attachments and connections.
- Do a visual check of the complete vehicle.
- Switch to pushing mode and check the smooth manoeuvrability of the vehicle.
- Switch to driving mode, switch the vehicle on and check the battery voltage.
- Check all lighting components for functionality.

Test drive

- Initially drive carefully and observe if the driving behaviour of the vehicle has changed.
- Watch for unusual sounds.
- Conduct a braking test.

BRAKES

☞ **Note:**
Switch the vehicle off in push mode. – This makes pushing the vehicle easier.

The vehicle is fitted with a double security system, consisting of:

– the drum brake (option),
– the motor brake and
– an electro-magnetic spring pressure brake (magnetic brake).

MOTOR BRAKE

The function of the motor brake evolves by the type of approach of the motor through the power electronic.

FUNCTIONALITY

With retracted driving lever the induced motor voltage is short circuited by a programmable tacting frequency that continuously brakes the vehicle down to almost stillstand.

With the programmable tacting frequency the braking process can be adjusted from "soft" to "full-stop".

When traveling downhill the motor switches to generator operation. This effects that the energy won is fed in to the drive batteries (energy recycling).

DRUM BRAKES

(Option)

The two drum brakes for the driving wheels are activated by the hand brake lever.

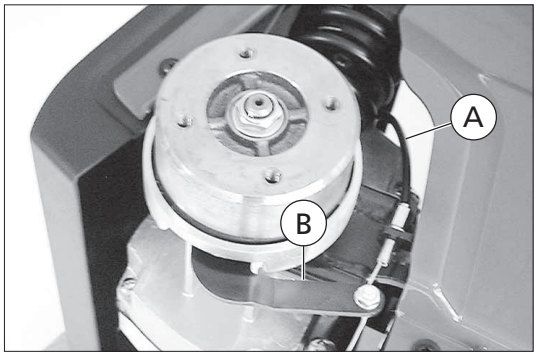
ADJUSTING

The drum brake is adjusted via the bowden cable.

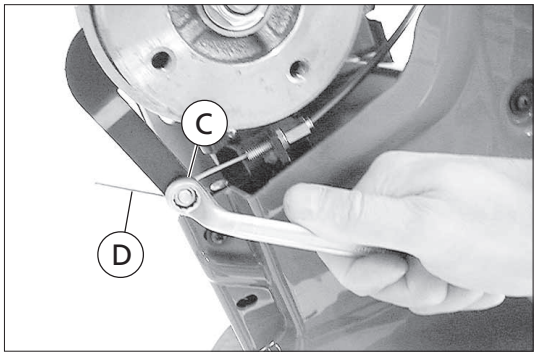
– Jack up the vehicle and disassemble the front wheels.
– Set the brake lever to push mode.
– Pre adjust the bowden cable (fig. 3–1/ A) at the brake arm (fig. 3–1/ B). – To do so loosen the nuts (fig. 3–2/ C) pull the core (fig. 3–2/ D) and retighten the nut.
– Loosen the counter nuts from the adjustment screws (fig. 3–3/ E and 3–4/ E) and screw them back.
– Fine-tune the bowden cable by turning the adjustment screw (turning outward = spanning).
– For testing slowly move the brake lever forward and backward and while doing so check the braking function by turning the drums (fig. 3-3/ F).

☞ **Note:**
The bowden cable is adjusted correctly if the drum brake already shows effect when the switching if the micro switch (fig. 3–4/ G) can be heard.

– If necessary correct the adjustment.
– Recounter all adjustment screws.
– Mount the front wheels and jack the vehicle down.



3–1



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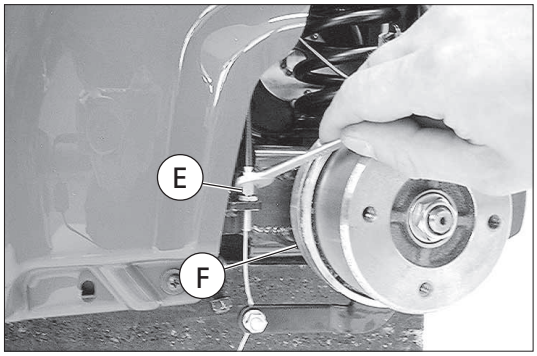
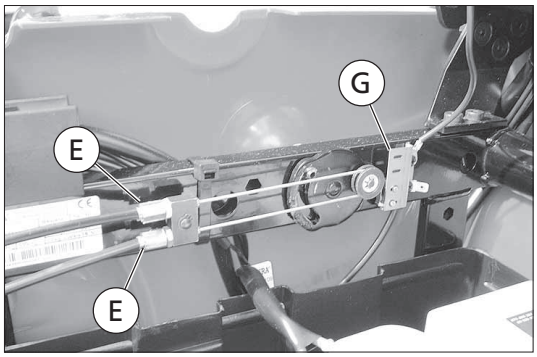


3–3



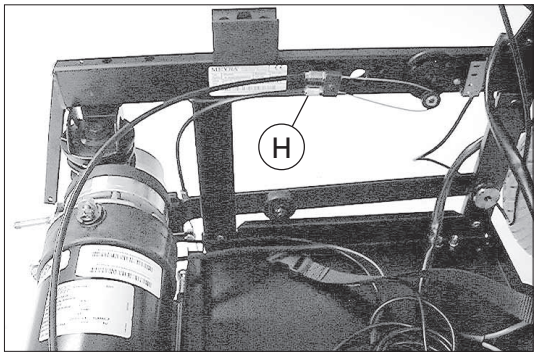
3–4

☞ **Note:**
After the adjustment the following must be checked:

a) with disengaged brake (push mode) the vehicle has to be pushed easily (bowden cable taut).

b) While the brake is engaged the vehicle may not be moveable at all.

☞ **Note:**
If the drum brake slips on one or both sides even though the adjustment is correct the drive has to be sent in for maintenance.



3–5

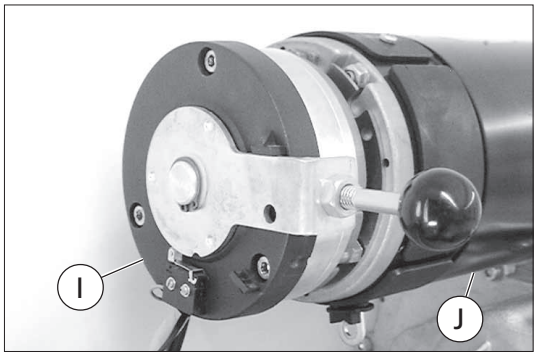
REPLACING THE BOWDEN CABLE

During replacement take care that the short bowden cable cover runs from the lower adjustment screw (fig. 3–5/ H) to the right brake arm (fig. 3–5) on right side use. For left hand operation it has to run from the lower adjustment screw to the left hand brake arm.

After replacing the bowden cable adjust the drum brake.

MAGNETIC BRAKE

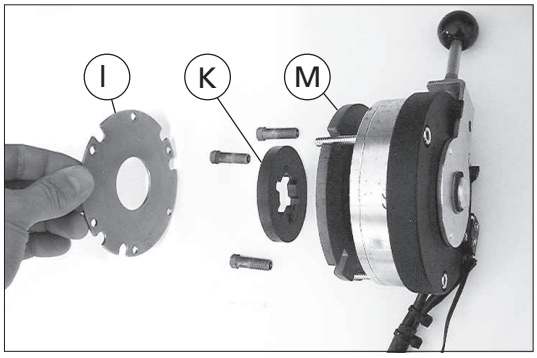
A magnetic brake (fig. 3–6/ I) is flanged to the motor (fig. 3–6/ J). After the driving wheels come to a still stand, the magnetic brake instantly prevents rolling on inclines or slopes.



3–6

FUNCTIONALITY

The disc form brake pad (fig. 3–7/ K) is located between the flanged friction discs (fig. 3–7/ L) and the axially moving anchor disc (fig. 3–7/ M) and is mounted swivel proof through a hub to the motor shaft.



3–7

Braking condition

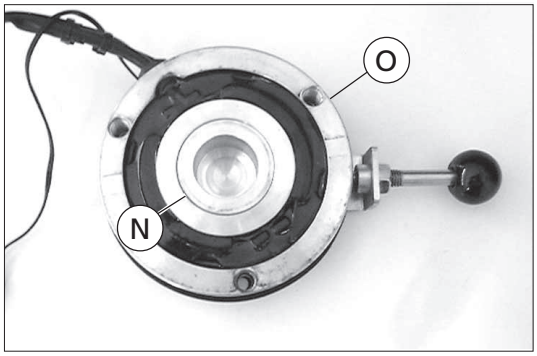
In a powerless state of the brake (this corresponds to a standstill of the vehicle) a central pressure spring (underneath the piston, fig. 3–8/ N) presses the brake pad over the anchor disc against the friction disc. This prevents a rotation of the motor. – Over the motor and the connected drive the vehicle is prevented from rolling.

Driving condition

With the battery current engaged the brake magnet (fig. 3–8/ O) creates a magnetic field that pulls the anchor disc against the force of the central pressure disc.

– Through this the brake pad and the motor shaft connected via the swivel proof hub can now move freely.

The wear of the pads can make an adjustment or replacement of the pads necessary.



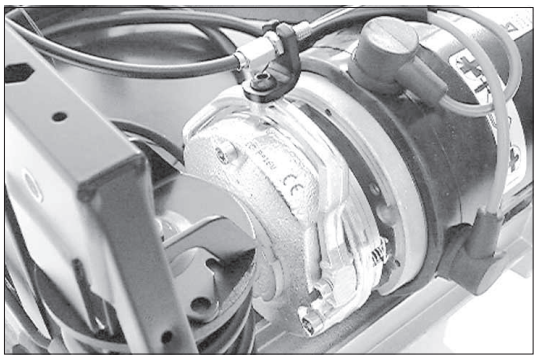
3–8

Push mode

In the push modus the central pressure spring is mechanically pulled away and sets the brake pad free.

With drum brake option

The central pressure spring is pulled back by throwing the drive-/push modus lever (fig. 3–8).


3–9

Without drum brake option

The central pressure brake is pulled back by the by the brake hanger (fig. 3–9).

REMOVAL

– Remove the front panel.

– Without drum brake option: Set the brake lever to push mode. Disassemble the brake bowden cable, view chapter < *magnetic brake/replacing the bowden cable* >.

– With drum brake option: Set the selection lever (fig. 3–10/ Q) to push mode.

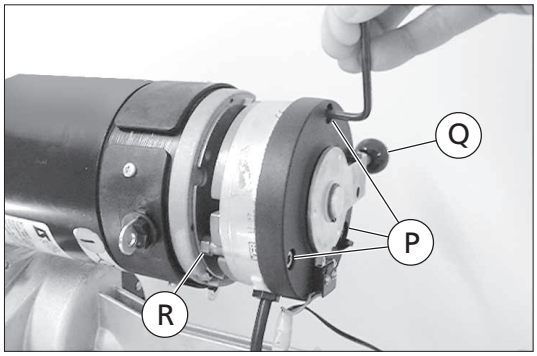
Removal and installation of the magnetic brake is done with 3 hexagon socket screws (fig. 3–10/ P).

– Remove the hexagon socket screws (fig. 3–9) and take out the magnetic housing together with the anchor disc and adjustment pieces (fig. 3–10/ R) from the motor.

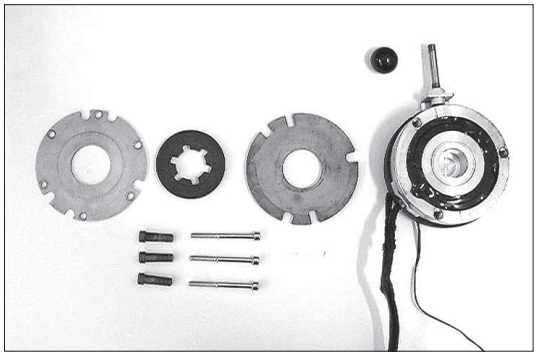
– Pull the brake pad from the swivel proof hub on the motor shaft.

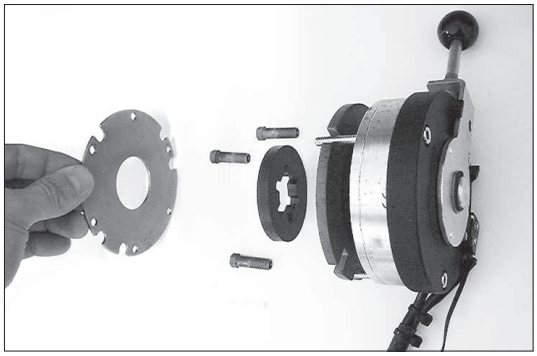
☞ **Note:**
The brake pad must easily let itself be pulled off of the star formed tappet. – Otherwise work the teething of the brake pad with a key file until they fit faultlessly.

– Remove the friction disc from the motor.



3–10


3–11


3–12

FITTING

The fitting is done corresponding in reverse order fig. 3–11 and 3–12).

Attention:
! After fitting the magnetic brake has to be readjusted, view chapter < *Adjustment* >.

Attention:
! If the tappet has to be removed from the motor shaft you have to check for the correct position of the hub when witting if back on. The hub side of the tappet has to face away from the motor.

ADJUSTING

Attention:

! Work has to be carefully carried out during the adjustment!

☞ **Note:**
The magnet brake for the E-wheelchair without optional drum brake is done in the same fashion.

The adjustment is done with three adjustment pieces (hollow hexagon screws) and the hexagon socket screws stuck through them.

– Push a 0,2 m thick feeler gauge (fig. 3–13/ S) from the outside between the anchor disc and brake magnet until it comes to rest on two adjustment pieces.

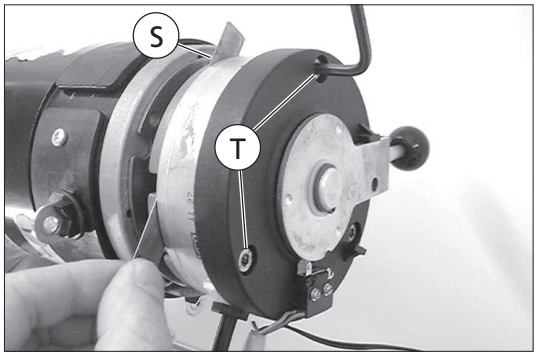
– Pull off both hexagon socket screws (fig. 3–13/ T) that are inserted in the adjustment pieces while simultaneously slightly moving the feller gauge back and forth, until the feeler gauge can just barely be moved.

– Repeat the same procedure at another pair of adjustment pieces in a 120° turn.

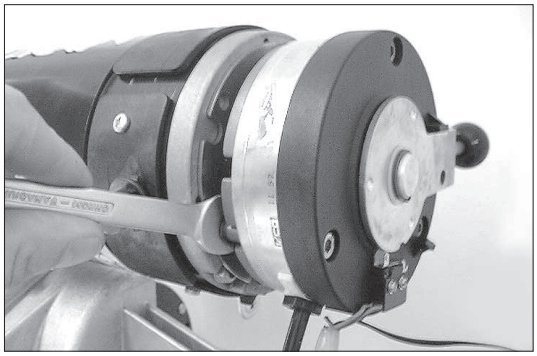
– Repeat the adjustment several times all the way around.

– Turn the adjustment pieces with the hexagon head against the friction disc (fig. 3–14). – The brake magnet is pressed against the heads of the hexagon socket screw thus countering the hexagon socket screws.

– Through the widening of the hexagon socket screws the feeler gauge regains a little slag. With correct fine-tuning the feeler gauge must now me moveable slightly sucking between the anchor plate and brake magnet.



3–13


3–14

FUNCTIONAL CHECKS

– Switch to push mode and check the free movement of the wheelchair.

– Do a driving test.

– Watch for unusual sounds.

– Check whether the vehicle comes to a complete standstill on the maximum permitted downhill gradient (view type plate).

REPLACING THE BOWDEN CABLE

(Only without option drum brake)

☞ **Note:**
The pressure spring (fig. 3–15/ A) at the counter plate serves for the reduction of the brake lever way and expands the optimal area of effectiveness of the air installation.

Removal

– Remove the counter nut (fig. 3–16/ B) from the adjustment screw at the counter plate. Pull back the adjustment screw (fig. 3–16/ C) and lift the bowden cable out through the slot.
– Unscrew the counter nut (fig. 3–17/ D) from the adjustment screw at the brake lever. Pull back the adjustment screw (fig. 3–17/ E) and lift the bowden cable out through the slot.

Remove the starlock quick fasteners (fig. 3–18/ F) from the eccentric (fig. 3–18/ G) and pull the eyelet (fig. 3–18/ H) at the end of the bowden cable from the eccentric.

– Screw the eye screw (fig. 3–18/ I) off of the frame and remove it together with the complete bowden cable.

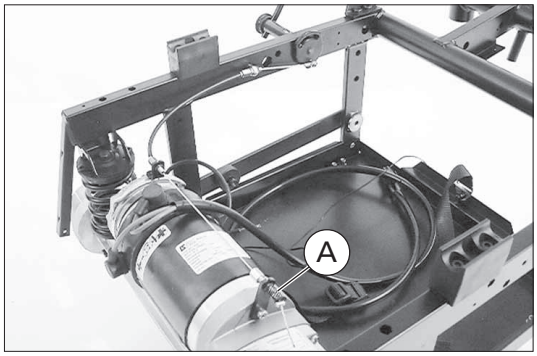
Fitting

The fitting is done analogue in reverse order.

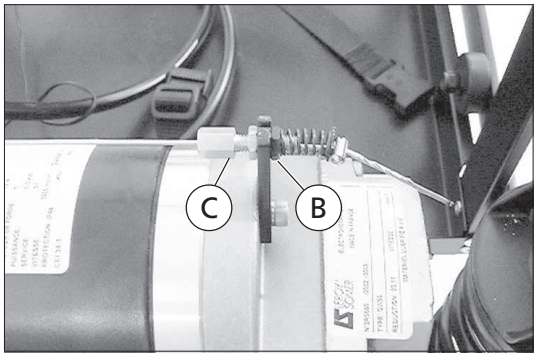
Attention:
! The starlock quick fastener has to be replaced under all circumstances. During fitting you have to watch for the professional assembly of the starlock quick fastener.

☞ **Note:**
The eye screw has to aligned before fitting so that the bowden cable is not bent at the adjustment screw.

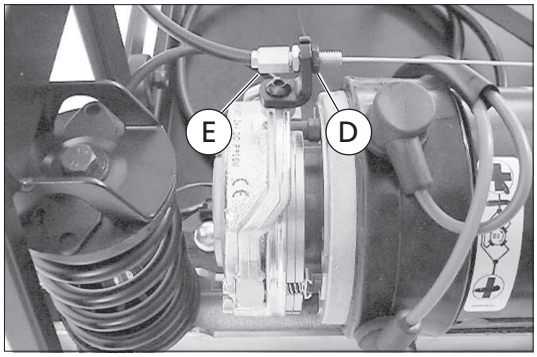
After fitting the bowden cable must be adjusted again.



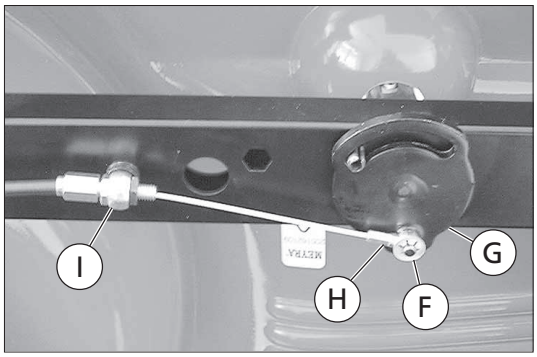
3–15



3–16



3–17



3–18

Adjusting

The bowden cable is adjusted with the adjustment screw at the brake lever (fig. 3–17/ E) and the adjustment screw on the eye screw.

– Loosen the counter nuts at the counter piece and the brake hanger.

– Adjust the bowden cable with the adjustment screws. – To do so turn the adjustment screw against the nut.

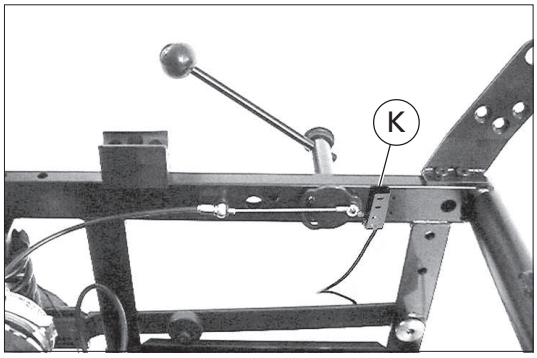
☞ **Note:**
The bowden cable is adjusted correctly if the magnetic brake already shows effect when the switching if the micro switch (fig. 3–19/ K) can be heard.

– Tighten the counter nuts again.

☞ **Note:**
After the adjustment the following must be checked:

a) with disengaged brake (push mode) the vehicle has to be pushed easily (bowden cable taut).

b) While the brake is engaged the vehicle may not be moveable at all.



3–19

STEERING

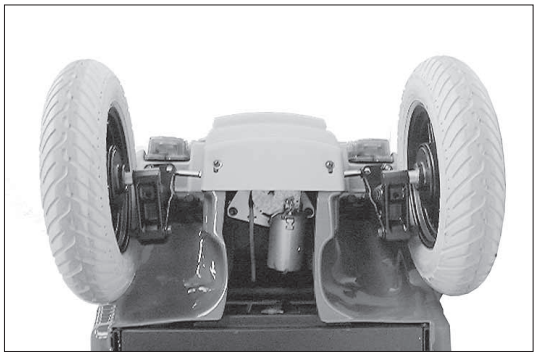
As a standard the Optimus is fitted with electrical steering (completely mechanically operating steering optional).

REPLACEMENT

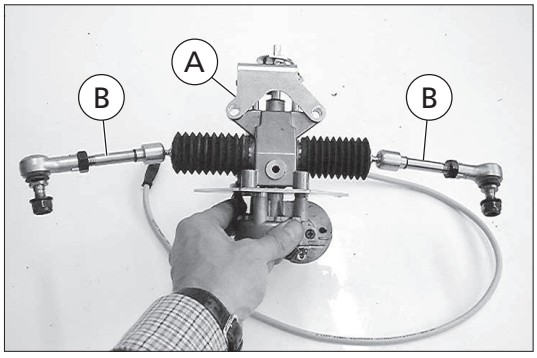
For replacement the complete steering unit (fig. 4–2/ A) with tie rod (fig. 4–2/ B) is supplied.

REMOVAL

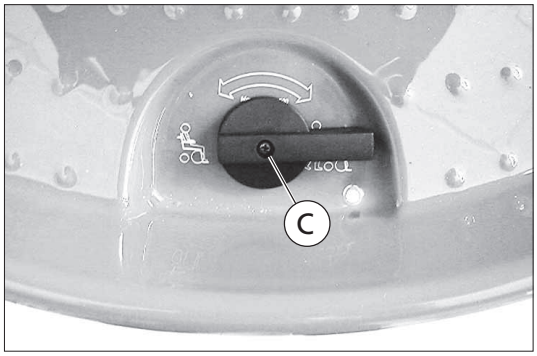
- Remove the screw (fig. 4–3/ C) out of the handle for switching the steering from drive- to push mode and remove the handle.
- Screw off the rear panel (view fig. 4–4).
- Unplug the cables for the taillights.
- Unlock the plug connections for the cables leading to the steering gear. – To unlock the locking lever press him down on the opposite side of the module.
- Screw the angle joints (fig. 4–4/ D) at the ends of the tie rods off of the wheel suspension (fig. 4–5).
- Unscrew the steering gear from the upper and lower suspensions (fig. 4–6/ E) and remove them.



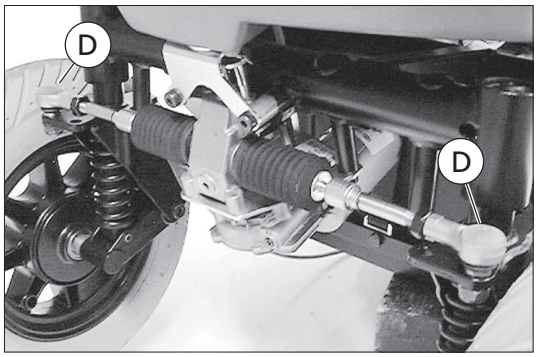
4–1



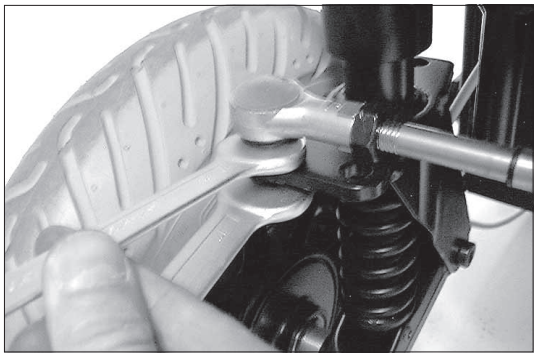
4–2



4–3



4–4



4–5

FITTING

– Set the steering gear to push mode (tie rods can be moved freely) and check wether the disc (fig. 4–7/ F) is positioned on the steering gear as shown in fig. 4–6.

– Screw the steering gear onto the upper and lower suspensions. – Start with upper screws.

☞ **Note:**
The plastic pinion (fig. 4–8/ G) of the director is tuned from the manufacturer with a cable binder for fitting. After the steering gear is screwed onto the suspensions the cable binder has to be removed.

– Screw the angle joints onto the wheel suspensions.

– Check the alignment and adjust if necessary, view chapter < *adjusting the alignment* >.

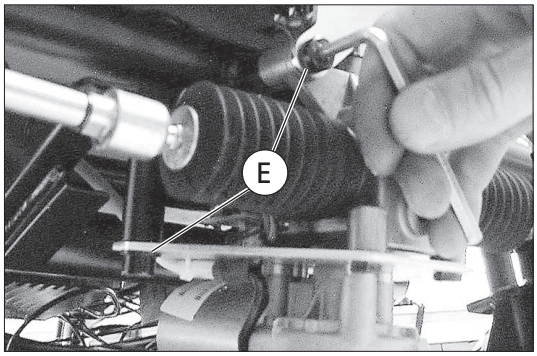
– Lay the cables for the steering and reconnect to the power module.

– Bind the cable for the steering and the cable of the left tail light together with a cable binder. Attach the cable under the seat with the mounted cable binders.

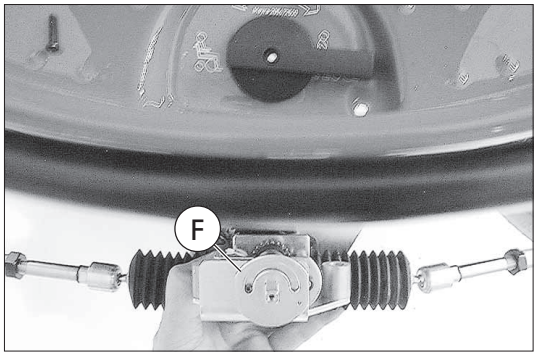
– Reconnect the plugs of the cables for the taillights in the rear panel.

– Screw on the rear panel.

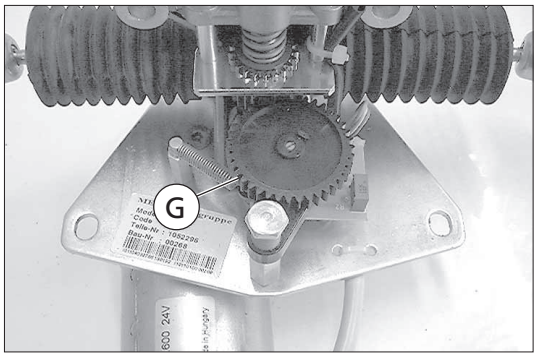
– Mount the handle and screw it on.



4–6



4–7



4–8

ALIGNMENT

CHECKING THE ALIGNMENT

– Remove the rear panel.

– Set the rear wheels for a straight course.

– Hold the alignment measure (fig. 4–9/ H) between the front rim horns and adjust so that the ends barely tough the rim horns.

– Hold the alignment measure between the rear rim horns (fig. 4–9/ I).

The alignment is adjusted correctly when the rear rim horns are 2 mm further apart than the front rim horns (2 mm toe-in).

☞ **Note:**
As a replacement for the wheel alignment measure you can also use two boards of about 30 cm length:
1.) Hold the boards parallel beside each other so that the end of one of the boards sits on the front rim horn of the left wheel and the end of the other board on the front rim horn of the right wheel.
2.) Draw a continuous line above the boards.
3.) Hold the boards in the same fashion onto the rear rim horns. – In correct adjustment the two partial lines must have been pulled apart by about 2 mm.

ADJUSTING THE ALIGNMENT

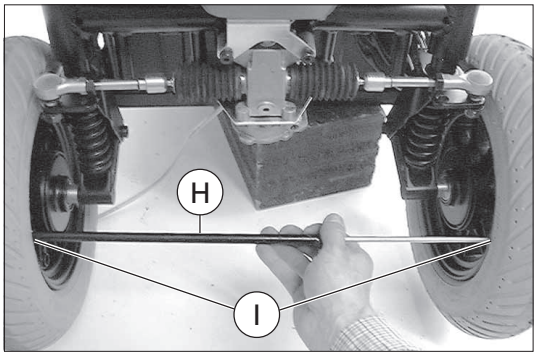
– Loosen the counter nuts (fig. 4–10/ J) inside and outside on both tie-rods.

– Turn the tie rod until the correct toe-in is achieved, view chapter < *checking the alignment* >.

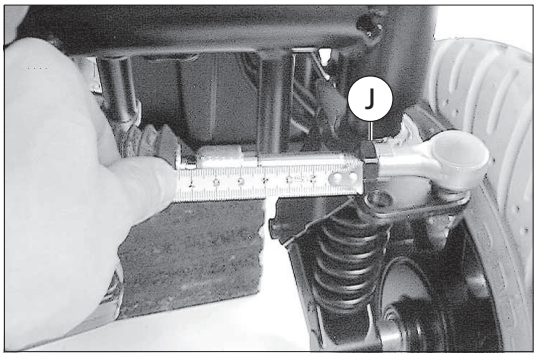
– Tighten the counter nuts again.

☞ **Note:**
During the adjustment the symmetry in length has to be observed, meaning both tie rods have to be the same length.

Attention:
! Under no circumstance may the straight course be created through different length tie rods.



4–9



4–10

SETTING THE DIRECTOR

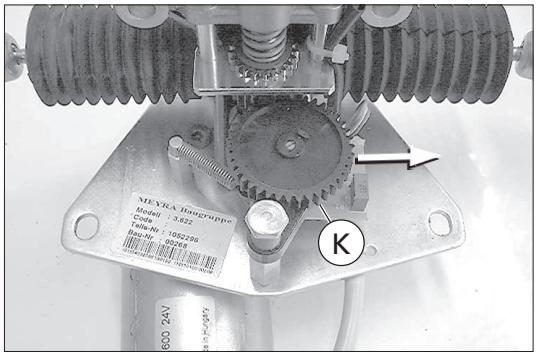
The director, actually a measuring potentiometer, is connected to the steering through gears. It signals to the power module in which setting the wheels currently are so that the motor is addressed accordingly.

The gears synchronise the steering and director. If the gears have shifted to each other by one or more teeth the wheelchair will drive a curve while the joystick is set to a straight course. The director then has to be realigned.

– Set the joystick minimally to backward motion so that the steering gear engages but the wheels do not start to turn.

– Pull off the gear (fig. 4–11/ K) that is attached to the director counter clockwise to the spring pressure of the gear at the steering gear (fig. 4–10), turn it by one tooth and replace it.

– Check the effect to the steering behaviour and reposition the gear accordingly until on backward, straight joystick setting no steering reaction is noticeable.



4–11

TYRES

CHANGING THE TYRES

☞ **Note:**
a) always change the tyres in pairs
b) also change the tubes.

ALL WHEELS

Disassemble the old tyre

– Jack up the vehicle. Remove the wheel screws (fig. 5–1/ A) and take the wheel off.

– Completely deflate the tyre.

– Press the fitting surface of the tyre inward into the recess (fig. 5–2/ B).

– Apply two mounting lever close beside each other between tyre and rim and lever the tyre off of the rim at this location, start at the valve (fig. 5–1/ C).

– Apply both mounting levers constantly further apart and pull the tyre over rim horn (fig. 5–2/ D).

– Pull out the tube.

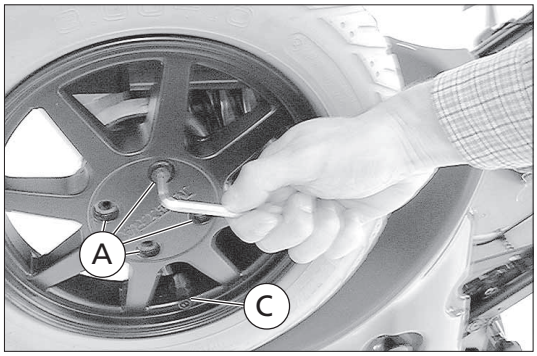
– Remove the second half of the tyre.

Mounting the new tyre

– Pull the fitting area of the new tyre over the rim horn with the mounting levers.

– Insert the new tube into the tyre. Insert the valve (fig. 5–1/ C) through the valve hole in the rim. Fill up the tube until it is barely without pressure.

– Pull the other fitting area of the tyre onto the rim starting opposite of the valve.



5–1

5–2

Attention:

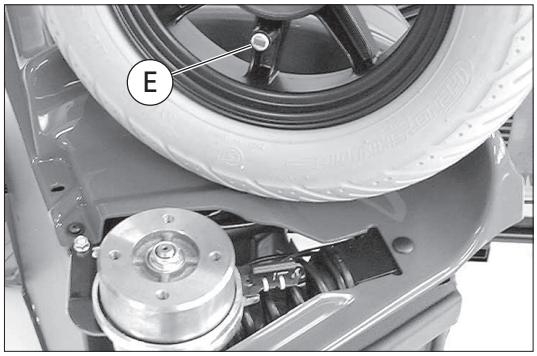
! During assembly the rim or the mounting lever may not damage the tube or let it be jammed.

– Pump the wheel up to a pressure of 2.5 bar.

– Fit the wheel onto the hub and screw in the wheel screws.

– Tighten the wheel screws to the predetermined torque. View chapter < *Maintenance/DIN norms and guidelines* >.

– Jack down the vehicle.



5–3

FRONT WHEELS

Attention:

! Mount the rim with the magnets for the speed gauge (fig. 5–3/ E) to the right side.

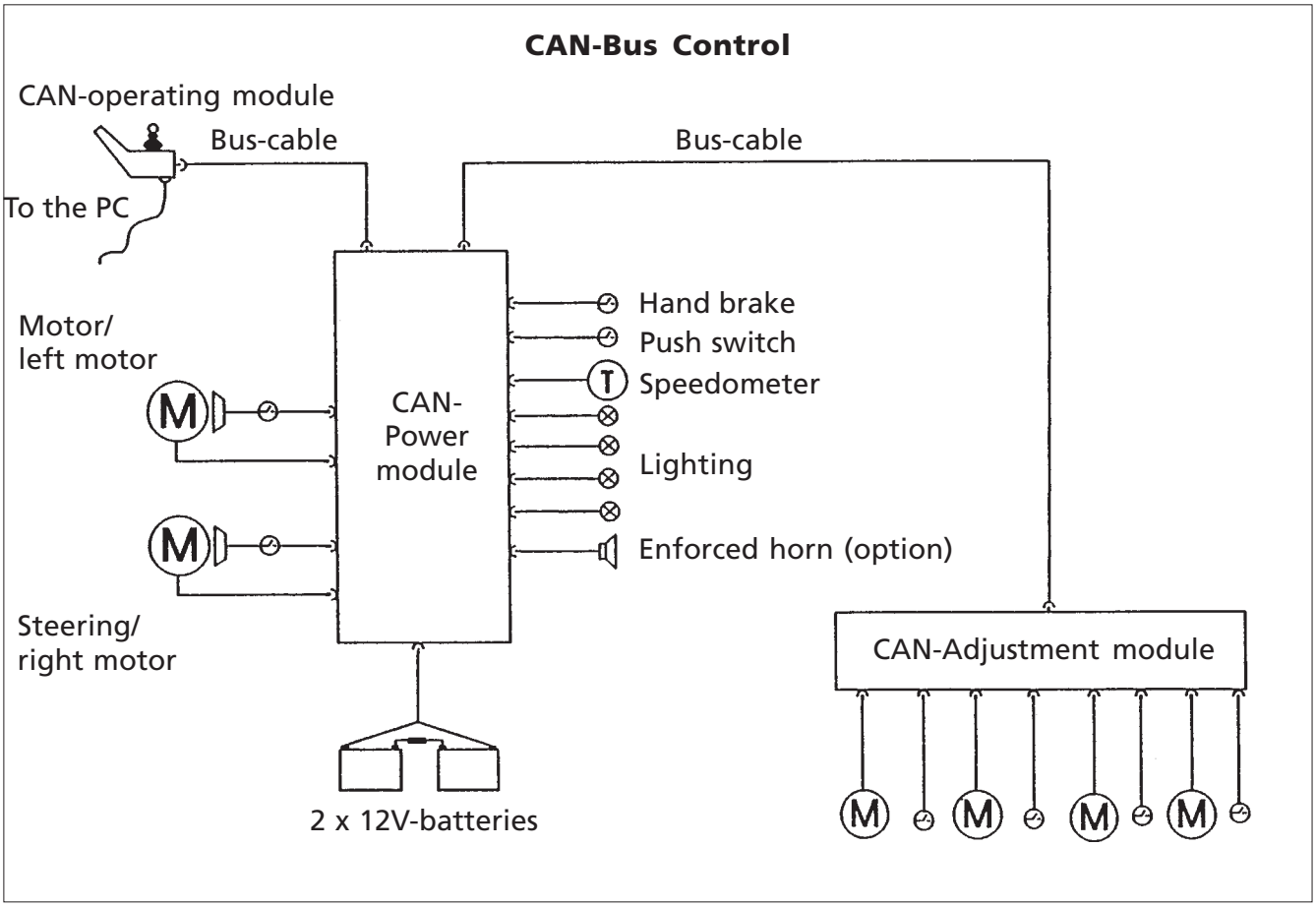
CAN-BUS CONTROL

The CAN-Bus Control consists of the modules (those are the electronic hardware components) and the CAN-Bus Software.

The CAN-Bus software is installed in the modules and controls the vehicle.

Over the bus cable data is transferred between the modules of the vehicle (view diagram below). The organisation of the data is performed by the CAN-bus software.

CAN-Bus Control



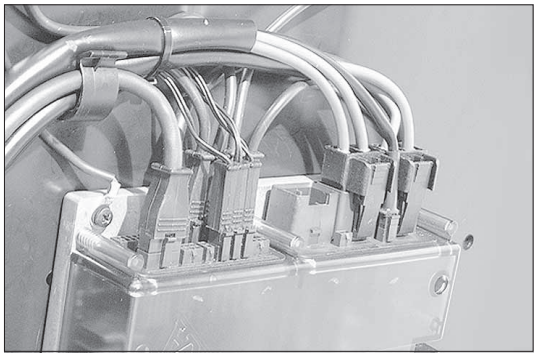
CAN-BUS HARDWARE

The hardware of the CAN-Bus control consists of

– Operating module
– Power module
– Adjustment module (option)

The modules used for the CAN-bus control have

– cables that are pluggable and secured against unintentional deletion (fig. 6–1),
– are code secured against swapping
– and are protected against spray water (IP 54).

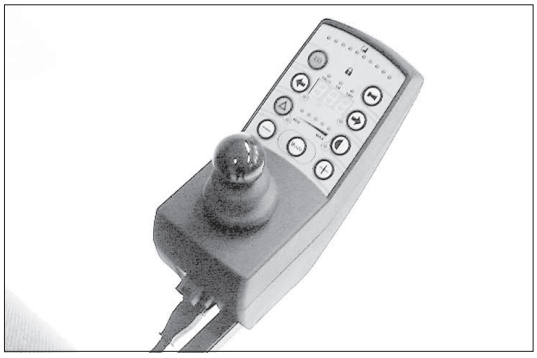


6–1

OPERATING MODULE

The operating module (BM; fig. 6–2) serves as the driving switchbox and has the following features:

– same operating module for all vehicles with CAN-bus control
– enforced joystick with "dead-man-function“
– LED report for lighting
– three-digit switchable speedometer display: optionally speed in km/h, daily km (manual reset) or total km:
– protection against unauthorised used through magnetic key
– integrated charging socket and signal unit
– plug connector for special operations: ON/OFF, external keys, external joystick (& service)



6–2

Magnetic key function

The wheelchair can be locked with a magnetic key. For this magnetic key function must be enabled. This is the case directly from the manufacturer. The clearance can be done subsequently over the CAN-bus software.

Attention:

! The magnetic key can damage magnetic cards. – Do not store the magnetic key near magnetic cards!

Locking

– For locking slide the magnetic key in vertical direction slightly left or right of the key symbol. – Afterward the display shows *SCH* (German abbreviation for Schloss = key). The wheelchair is now locked and can be switched off.

Switch functions

To supervise the settings for the drive resp. push mode and the faultless functioning of the micro switches the display shows the switch setting(s):

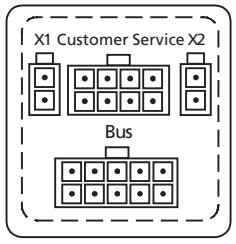
S-S (Switch pushing): The magnetic brake is disengaged and the push mode activated.

S-L (Switch steering): The steering is ungeared (only Optimus).

S-B (Switch brake): The drum brake is activated (only Optimus option).

Charging function

When a charger is connected to the operation device and the wheelchair is switched on the display shows *LAD*. The wheelchair cannot be driven.



Plug assignment

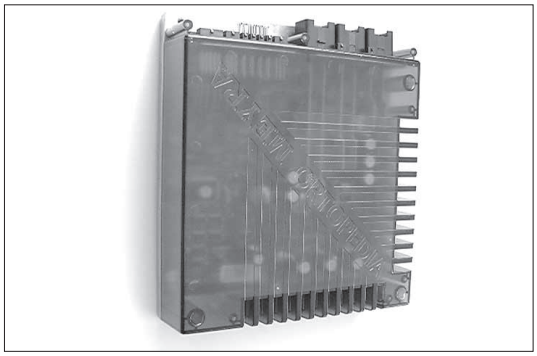
X1	external ON/OFF key
X2	external keyboard external joystick, special operations, PC-service-interface
Bus	Bus-cable

POWER MODULE

The power module (PM; view fig. 6–3) stores the settings of the driving parameters and adopts as the power electronic the addressing of the driving- and steering motor respectively on two motor wheelchairs the addressing of both driving motors.

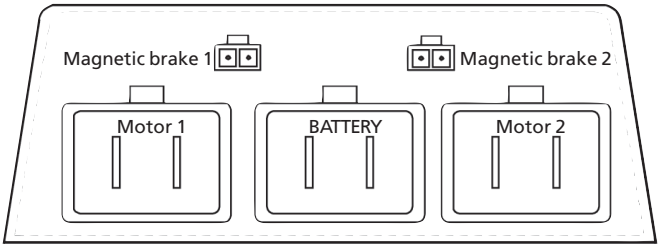
The inlets and outlets of the power module are short circuit proof, so that the lead fuse is not applicable. – Further features are:

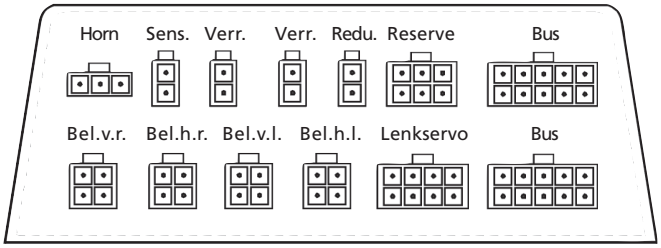
– Automatic and selective deactivation of disturbed outlets.
– Green and red LEDs as a status indicator, visible through the transparent lid. During faultless function a green and red LED light up shortly after one another when switching on the wheelchair.



6–3

PLUG ASSIGNMENT





(upper row from left to right)

Magnetic brake 1	magnetic brake (on two motor wheelchairs: left magnetic brake)
Magnetic brake 2	right magnetic brake (only on two motor wheelchairs)
Horn	enforced horn (option)
Sens.	Magnet sensor speed
Verr.	Micro switch magnetic brake
Verr.	Micro switch drum brake (only option Optimus)
Redu.	Speed reduction (option)
Reserve	external power supply
Bus	Bus-cable

(bottom row from left to right)

Motor 1	motor (on two motor wheelchairs: left motor)
Battery	battery cable
Motor 2	right motor (only on two motor wheelchairs)
Bel.v.r.	lighting front right
Bel.h.r.	lighting rear right
Bel.v.l.	lighting front left
Bel.h.l.	lighting rear left
Lenkservo	steering motor
Bus	Bus-cable

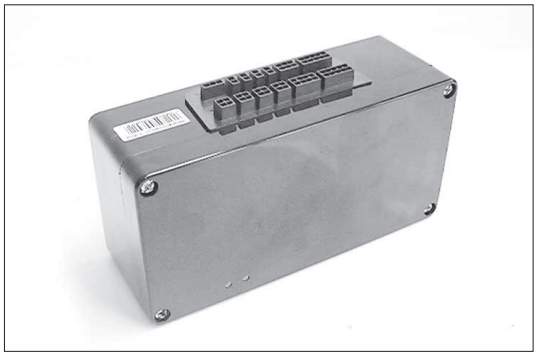
ADJUSTMENT MODULE

When applying adjustment units the vehicle is fitted with an adjustment module (VM; fig. 6–4) for addressing the adjustment motors. – The adjustment module is available in two different versions:

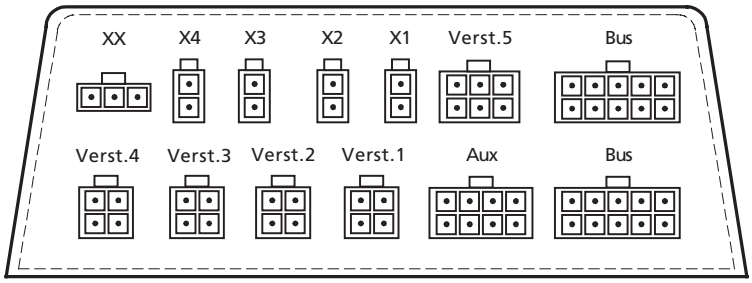
– VM1 for 4 adjustment drives (backrest, tilting, and two legrests)
– VM1 for 6 adjustment drives (needed for additional seat height adjustment)

The output current (0 to 10A) and the output voltage (0 to 24V) can be adjusted. – Further features are:

– Gentle motor initiation, operation via keys and/or joystick(s).
– Green and red LEDs as a status indicator. During faultless function a green and red LED light up shortly after one another when switching on the wheelchair.



6–4



PLUG ASSIGNMENT

XX	end-switch (on two motor wheelchairs and on the adjustment motor 1: mounted to the back end switch adjustment motor 1. On one motor wheelchairs: end-switch adjustment motor 2)
X1	Switch (reserve)
X2	locking switch adjustment motor 5 against adjustment motor 2
X3	locking switch adjustment motor 2 against adjustment motor 5
X4	end-switch adjustment motor 4
Verst. 1	Adjustment motor 1 (electrically adjustable legrest left, code 86)
Verst. 2	Adjustment motor 2 (electrically adjustable legrest right, code 86)
Verst. 3	Adjustment motor 3 (electrically adjustable seat angle, code 118)
Verst. 4	Adjustment motor 4 (electrically adjustable back, code 25)
Bus	Bus-cable

Only Adjustment module 2 (VM2)

Verst. 5	Adjustment motor 5, with end-switch (electrically adjustable seat height, code 27)
Aux	optional outlet/AUX

CAN-BUS SOFTWARE

The CAN-Bus software is installed on all modules.

Operating module, power module and adjustment module have different tasks. That is why different parts of the CAN-Bus software are installed on them.

A series of functions are included in the CAN-Bus software. Some functions (such as driving behaviour, switch off period) define the features of the wheelchair and can be amended. Other functions (such as diagnostic functions, error-lists) act for the service and repair.

The amendable functions can be adjusted

a) indirectly through the service program (in connection with a PC, all functions available)

b) directly through the operating module (only amendments to the driving behaviour)

The main portion of the setting for amendable functions is centrally stored on the power module.

Current software (updates) for single modules is downloaded per internet from a Meyra-Homepage-Site and transferred to the respective module. The software version installed on the modules of a vehicle should always show the same version number.

☞ **Note:**
We recommend checking the current status of the software version regularly over the internet.

SERVICE PROGRAM

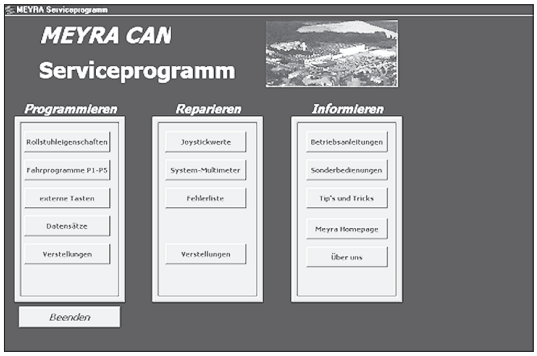
The service program (item no. 1051871, fig. 6–5) is installed on a PC. The PC is connected to the vehicle with a data cable. – For this the data cable is plugged into the serial socket of the PC and the 8-pin socket *Service* (fig. 6–6/ A) on the backside of the operating module, view chapter < *Operating module* >.

Afterwards different functions can be executed:

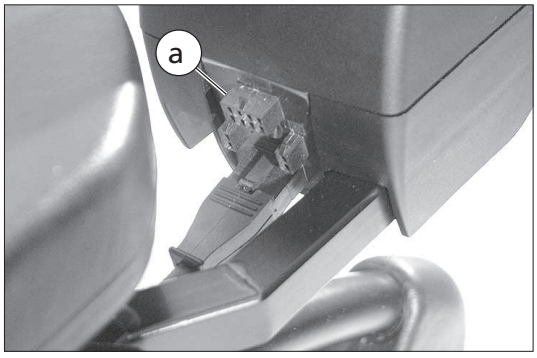
– Updating the CAN-Bus software

– Influencing functions that are included in the CAN-Bus software

– A function check resp. error elimination based on the stored and current data



6–5



6–6

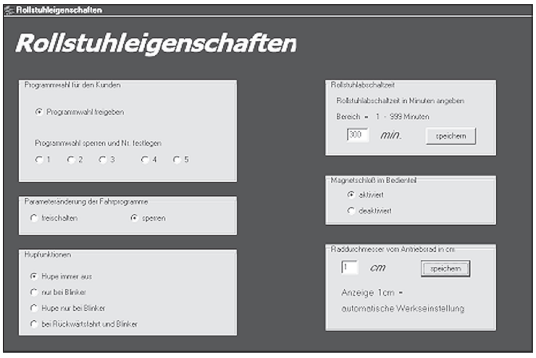
Functions of the service program

The service program is divided into the sections

– programming
– repair
– information

The amendments carried out with the service program become active after switching the wheelchair off and back on.

Precondition for the operation is one of the following operating systems: Windows 98/ME/NT or 2000.



6–7

Section programming

Wheelchair features:

– locking or activating the amenability of driving behaviour over the operating module (fig. 6–7)
– locking or activating the program selection P1-P5 for the user
– selecting horn function
– setting the switch off period
– activating/deactivating the magnetic lock
– setting the wheel diameter

Driving programs:

– programming the driving parameters 1-9 for the driving programs P1-P5 (amendment of the driving behaviour)

External keys:

– Setting the functions for external keys

Records:

– Current operating software (download of new wheelchair software to the wheelchair)
– Setting the wheelchair type
– Basic settings (resets the parameters to the manufacturer settings)
– Setting the driving parameters back to the manufacturer settings

Adjustments:

– Adjusting the adjustment motor voltage

Section repair

Joystick values:

– Display of the signal values from the joystick to the motor director

System multimeter:

– Measuring the battery voltage, motor voltage and motor current
– Data recorder for the current consumption of the motor

Error list:

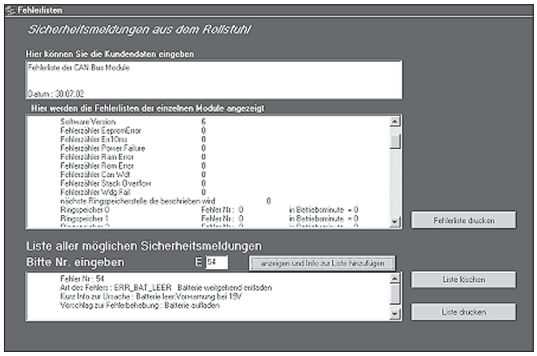
– Input item for customer data
– Error count by readout of all error lists of the CAN-Bus modules (fig. 6–8)
– Time indicator for the last 10 errors
– Error description for the listed error codes

Update per internet:

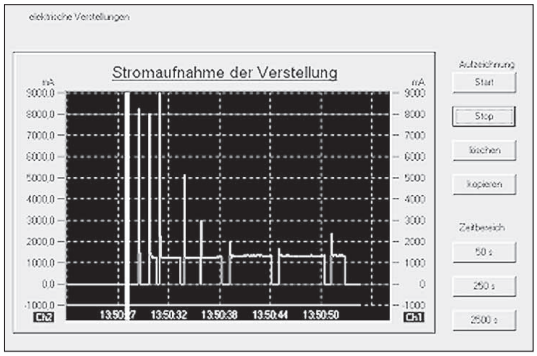
– Internet connection for downloading new software

Adjustments:

– Data recorder for the current consumption of the adjustment motors (fig. 6–9)



6–8



6–9

Section information

Operating manuals:

– Operating manuals stored on the PC can be viewed or printed.

Special operations:

– Information to special operations stored on the PC can be viewed or printed.
– Tipps & tricks

MEYRA-Homepage:

– Direct link to the MEYRA-Homepage

About us:

– Version number of the service programs

DRIVING PROGRAMS

The software installed on the power module contains five driving programs with different driving behaviour. You can for example call on separate programs for indoor and outdoor use. The user can change the driving behaviour of the wheelchair at any time by changing into a different driving program. The manufacturer settings of these driving programs can be viewed in table 1.

Each of the driving programs is defined through the respective setting of the 9 parameters. The parameters are set by the manufacturer to the values shown in table 2.

The values serve for orientation and should as a rule be maintained. Should the demands of the user vary from the manufacturer settings, the values for amending the driving characteristics are to be changed.

Table 1: Standard manufacturer setting of the driving programs

Program	Characteristic
Program 1:	standard driving behaviour (outdoor)
Program 2:	slower, softer driving behaviour (indoor)
Program 3:	top speed as in program 1, but softer driving behaviour
Program 4:	top speed as in program 2, but harder driving behaviour
Program 5:	standard driving behaviour (outdoor)

Table 2: Standard manufacturer setting of the parameters

Programs					Parameter	
P1	P2	P3	P4	P5	No.	Description
09	05	09	05	09	1	top speed forward
05	03	05	03	05	2	top speed backward
05	03	03	05	05	3	acceleration straight course
05	03	04	05	05	4	braking straight course
05	03	03	05	05	5	top speed in curves
05	03	03	05	05	6	acceleration in curves
05	03	03	05	05	7	braking in curves
05	07	07	05	05	8	Zero-zone steering
05	03	03	05	05	9	sensitivity of the steering

PROGRAMMING WITH THE OPERATING MODULE

The following functions can be amended directly through the operating module:

– Adjustment of the parameters
– Setting the joystick priorities

ADJUSTMENT MODUS

For adjustment of the driving behaviour through the operating module you have to switch from the driving modus into the adjustment modus. This is done by pressing a certain key combination on the operating module, view chapter < *switching into the adjustment modus* >.

PROGRAMMING FOIL

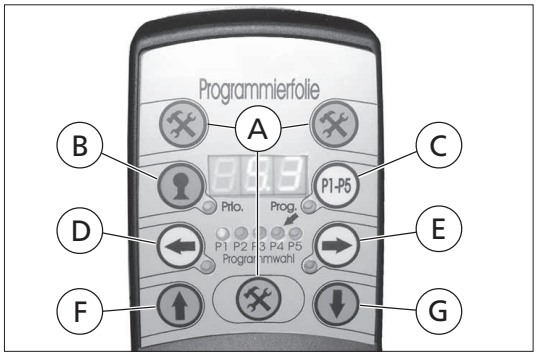
When the adjustment modus is activated the function of the keys changes.

In order to make allocation of these functions easier, a programming foil (Order no. 1 052 967, view fig. 6–10) is placed onto the operating field of the operating module. This foil displays the key functions that are activated when pressing the keys while the adjustment modus is active.

Key allocation in the adjustment modus

(with applied programming foil, fig. 6–10)

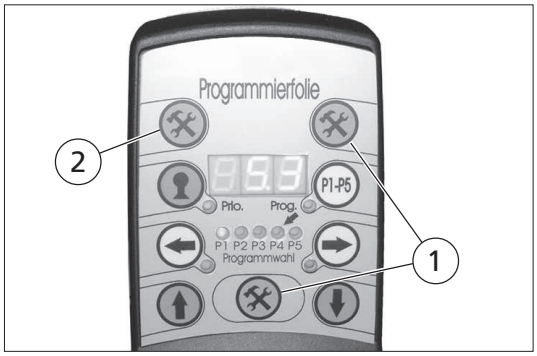
(A) Service-keys
(B) Joystick-key
(C) P1-P5-key
(D) Left-key
(E) Right-key
(F) Up-key
(G) Down-key



6–10

SWITCHING TO THE ADJUSTMENT MODUS

– Switch the wheelchair on.
– Press the lower and the right service-key (fig. 6–11/ 1) simultaneously and keep the pressed.
– Additionally press the left service-key (fig. 6–11/ 2) and release it again. – This switches the wheelchair off.
– Then release all keys. – After the next switching on the display will show *HHH* after the initialisation as a signal that the adjustment modus has been activated.



6–11

FUNCTIONS

Adjustment of the driving behaviour consists of two parts:

– Pressing the joystick-key (fig. 6–12/ 3): the joystick priority of the maximally connected 3 joysticks can be determined.
– Pressing the P1-P5-key (fig. 6–14/ 4): The parameters for the driving behaviour can be set.

☞ **Note:**
Both keys are locked against each other.

6–12

ADJUSTING THE JOYSTICK PRIORITY

– Press the joystick-key (fig. 6–12/ 3). – The joystick-key LED light up and the display shows *PJO*.
– Align the joystick in the desired priority sequence. – The joystick that is aligned first has the highest priority. The joysticks that are not aligned are deactivated. While the first joystick is aligned (e.g. the external joystick for an attendant, fig. 6–13), the display changes to Display and so forth PJ 1.
– Press the joystick-key. – The program is ended. The corresponding LED goes off and the display again shows *HHH*.

6–13

☞ **Note:**
Joysticks that are not moved during the adjustment are deactivated.

ADJUSTMENT OF THE PARAMETERS

Selecting the driving program

– Press the P1-P5-key (fig. 6–14/ 4). – The P1-P5-key LED lights up. The LED for the program 1 (P1) lights up in the program number display (for P1 to P5; fig. 6–14/ 5).

☞ **Note:**
By pressing the left-key (fig. 6–15/ 6) or right-key (fig. 6–15/ 7) the driving program is determined within which the adjustments to the parameter contents are to be made. – The selected program is indicated through the lighting up of the corresponding LED.

The display shows the first parameter of the selected program and its contents (e.g. 1–5 for the first parameter with the adjusted parameter value 5).

Selection of the parameter

– Press the bottom service-key (fig. 6–16/ 8) to select the parameter from the parameters 1 to 9 that is to be set.

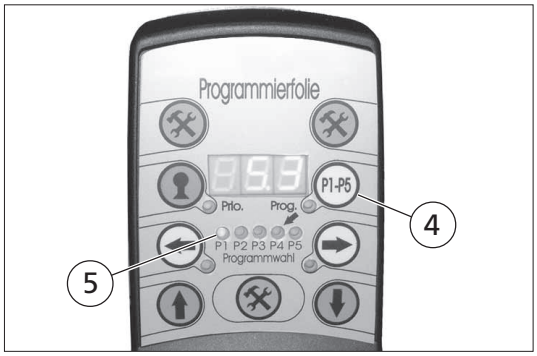
Changing the parameter value

– Pres the up-key (fig. 6–17/ 9) or down-key (fig. 6–17/ 10) to change the content of the parameter to a value between 1 and 9.

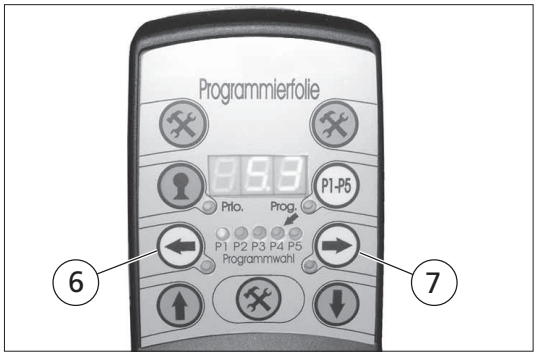
– Select any further parameters (view chapter < *selection of the parameter* >) and adjust their values.

Concluding the parameter settings

– Press the P1-P5-key (fig. 6–18/ 11). – The program is ended. The corresponding LED goes off and the display again shows *HHH*.

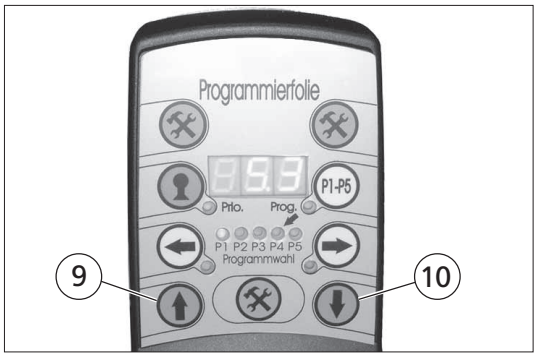


6–14



6–15

6–16



6–17

6–18

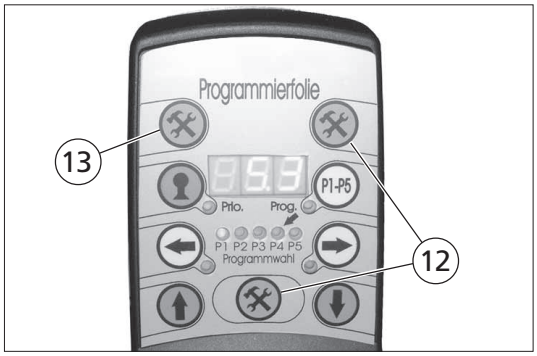
CONCLUDING THE ADJUSTMENT MODUS

In order to conclude the adjustment modus and switch back into the driving modus the same keys are pressed in the same sequence as when starting the adjustment modus:

– (while the vehicle is switched on:) Press the lower and the right service-key (fig. 6–19/ 12) simultaneously and keep the pressed.

– Additionally press the left service-key (fig. 6–19/ 13) and release it again. – This switches the wheelchair off.

– Then release all keys. – After the next switching on the display will show 0.0 KMH after the initialisation as a signal that the adjustment modus has been deactivated and that you have returned to the normal driving operation.



6–19

QUICK RESET TO STANDARD VALUES

Should you have lost the overview during the adjustments, it is possible with an easy way to reset to the standard manufacturer values and at the same time exit the adjustment modus again.

Initial situation

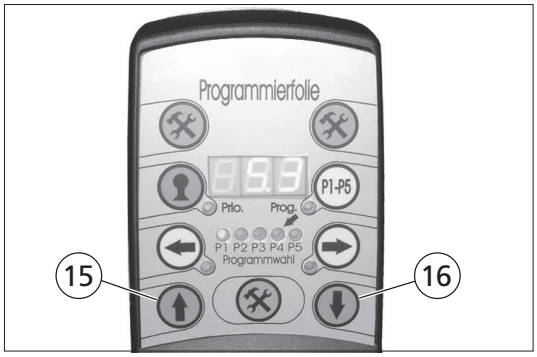
The adjustment modus was activated and to adjust the driving behaviour parameters the P1-P5-key was pressed. This is evident through the lighting up of one of the LEDs marked P1 to P5.

6–20

Measure

– For quick adjustment repeatedly press the P1-P5-key (fig. 6–20/ 14). – The display shows *HHH*.

– Then simultaneously press the up-key (fig. 6–21/ 15) and the down-key (fig. 6–21/ 16). – The display immediately shows *0.0 KMH*. The adjustment modus was ended automatically through the key combination and the vehicle has switched to the normal driving operation. The vehicle now drives with the manufacturers standard parameter settings again.



6–21

CAN-BUS ERROR LIST

Error-Number	Type of Error	Short-info to the cause	Suggestion for trouble shooting
E00	Watchdog power fail	The WD-module has detected low voltage	Local error
E01	Watchdog Reset	During initiation it was noticed that the reset was activated through a WD-timeout.	Local error
E02	Watchdog Failure	An error in the Watchdog-module was noticed	Local error
E03	RAM error	An error in the RAM was noticed	CPU error
E04	ROM error	An error in the ROM was noticed	CPU error
E05	Stack-error	An overflow of the stack was noticed	CPU error
E06	EEPROM-error (init)	An error was noticed during initiation of the EEPROM; EEPROM is not accessible	EEPROM-error
E07	EEPROM-error (check)	A checksum-error was noticed in the EEPROM; but the EEPROM itself is accessible	EEPROM-error, possibly power UP / power DOWN
E08	CAN-error (init)	Error during initiation of the CAN-controller	CPU error
E09	CAN-error (passive)	The CAN module has switched into the *error-passive*-mode	Bus-error: cable, driver module
E10	CAN-error (off)	The CAN module has switched into the *bus-off*-mode	Bus-error: cable, driver module
E11	CAN-error (overflow)	Receiving buffer overflow of the CAN module	Bus-error: cable, driver module

CAN-BUS ERROR LIST PAGE 2

Error-Number	Type of Error	Short-info to the cause	Suggestion for trouble shooting
E12	Error 10ms	The maximum period of the 10ms-tak was injured	Software error: time-out
E13	RUNTIME ERROR	General runtime error	Software-error
E14	ERR_WRONG_SYS_STATE	The system processing control is in an unknown state	Software-error
E15	SW Power-Fail	The software has detected low voltage	Low voltage, power UP/power DOWN error
E16	High temperature	A high temperature of the power stage was noticed	Motor-overload, high temperature PM
E17	I2T	The I2T-supervision was activated	Motor-overload, power integration, error in the power measurement
E18	ERR_OFFSET_ERROR	The automatic offset-reconciliation of the power measurement has failed (PM)	Error in the power measurement PM. Better: Software version 4 and up
E19	BUS-ON-error	No *operating module activated* has been reported; there is obviously a shortage of the BUS-ON-line against 24V	Bus-cable-error, error in the switch on logic BM
E20	DMS-error	Shortage of the DMS-line against +24V noticed (PM)	Bus-cable-error, error in the dead-man-switch-logic, joystick-error
E21	CAN-WD timeout BM1	The operating module 1 did not send a WD-message	Bus-cable-error
E22	CAN-WD timeout BM2	The operating module 2 did not send a WD-message	Bus-cable-error

CAN-BUS ERROR LIST PAGE 3

Error-Number	Type of Error	Short-info to the cause	Suggestion for trouble shooting
E23	CAN-WD timeout VM	The adjustment motor module did not send a WD message	Error no further relevant!
E24	Motor short circuit	Short circuit of the drive motors	Short circuit of the power stage, in the motor cable or the motor itself
E25	Motor idle	The drive motor is running idle (missing load)	Short circuit of the power stage, motor-cable-error, motor defective (brushes)
E26	Over voltage	An over voltage (>35V) was detected for a period of more than 100ms	Battery over voltage
E27	ERR_ON_BM_1	The first operating module did not answer to the message CAN_BM_ON_REQ	Error in the BM, Bus-cable-error
E28	ERR_ON_BM_2	The second operating module did not answer to the message CAN_BM_ON_REQ	Error in the BM, Bus-cable-error
E29	ERR_RELAIS_CLOSED	The relay has been recognised as closed, even though it should be open (or motor-contact-/collector-/carbon-brush-error)	Main-relay-error, error in the power stage, motor-cable-error, motor defective (brushes). Better: Software version 4 and up
E30	ERR_RELAIS_OPEN	The relay has been recognised as open, even though it should be closed	Relay-error. Better: Software version 4 and up

CAN-BUS ERROR LIST PAGE 4

Error-Number	Type of Error	Short-info to the cause	Suggestion for trouble shooting
E31	ERR_WRONG_EEP_PARA	A wrong *module*-entry in the EEPROM was found	Software-error
E32	ERR_WRONG_CTR_STATE	The processing control of the controller is in an unknown state	Software-error
E33	ERR_LOC_SW_END	The end-switch is active, therefore the driving mode is disrupted	No error speed reduction
E34	ERR_LOC_SW_BRAKE	The brake switch is active, therefore the driving mode is disrupted	No error, Display: *S-B*
E35	ERR_LOC SW_LOCK	The locking (push-) switch is active, therefore the driving mode is disrupted	No error, Display: *S-S*
E36	ERR_LOC_SW_STEER	The locking (steering-) switch is active, therefore the driving mode is disrupted	No error, Display: *S-L*
E37	ERR_LOC_CHARGE	Charging is taking place on an operating module, therefore the driving mode is disrupted	No error, Display: *Loc*
E38	ERR_LOC_LOCK	The anti-theft device is active on the active operating module, therefore the driving mode is disrupted	No error, Display: *SCH*
E39	ERR_JOY	The joystick has been noticed as faulty on the active operating module, therefore the driving mode is disrupted	Joystick-error, error in the local voltage provision
E40	ERR_INIT_ERR_PM	An error occurred during initialisation of the power module, therefore the driving mode is disrupted	Software-error PM

CAN-BUS ERROR LIST PAGE 5

Error-Number	Type of Error	Short-info to the cause	Suggestion for trouble shooting
E41	ERR_INIT_ERR_BM1	An error occurred in the initialisation of the first operating module, therefore the driving mode is disrupted	Software-error BM1
E42	ERR_INIT_ERR_BM2	An error occurred in the initialisation of the second operating module, therefore the driving mode is disrupted	Software-error BM2
E43	ERR_INIT_ERR_VM	An error occurred in the initialisation of the adjustment motor module, therefore the driving mode is disrupted	Software-error VM
E44	ERR_BRAKE	An error of the brakes was notices	Brake-error, brake-drive-error
E45	ERR_BRAKE_FAIL	An error in the addressing of the brakes was noticed	Brake-error, brake-drive-error
E46	ERR_MOT	An error was noticed during the initialisation of the motor-addressing (power current at 0% PWM)	Error in the power stage of the drive PM1/ PM2
E47	ERR_SERVO_POTI	An error was noticed during the supervision of the steering servo-potentiometer	Error in the cable to the steering servo or at the encoder of the steering poti
E48	ERR_BM_JOY_ERR	An error was noticed during the supervision of the joystick (BM!)	Joystick-error BM: Joystick, plug connection, cable
E49	ERR_BM_DMS_ERR	An error was noticed on an operating module in the DMS-signal-generation	Joystick-error BM: Joystick, plug connection, cable, conductor board

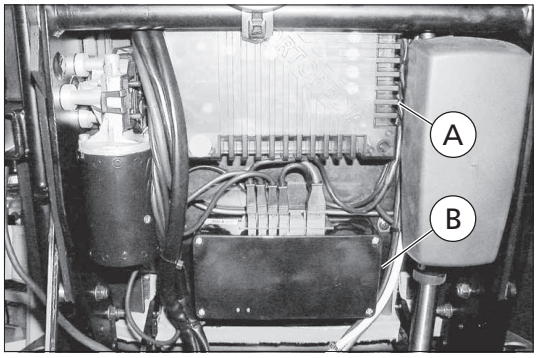
CAN-BUS ERROR LIST PAGE 6

Error-Number	Type of Error	Short-info to the cause	Suggestion for trouble shooting
E50	ERR_VM_BM_INPUT	By error a plug of an external BM-accessory was attached to one of the adjustment motor modules	User-error!
E51	ERR_VM_FAULT_14	An error in the addressing of the motors 1-4 occurred in one of the adjustment motor modules	Short circuit at an adjustment motor
E52	ERR_VM_FAULT_56	An error in the addressing of the motors 5-6 occurred in one of the adjustment motor modules	Short circuit at an adjustment motor
E53	ERR_VM_OFFSET	The offset alignment of the power current measurement of the adjustment motor module failed	Not implemented!
E54	ERR_BAT_LEER	Battery empty: pre-warning at 19V	Battery largely discharged
E55	ERR_BAT_TIEF	Battery deep discharged at 18V	Battery deep discharged
E56	ERR_VM_I2T_ERR	The I2T-supervision of the adjustment motor module was activated	Overload off an adjustment motor
E57	ERR_VM_OVERTEMP	The high temperature supervision of the adjustment motor module was activated	High temperature-error VM
E58-E60	(Not allocated)	-	-

REPLACING THE CAN-BUS MODULES

The power module (fig. 6–22/ A) is installed behind the rear panel, on the underside of the seat.

The adjustments module (fig. 6–22/ B) when existent, is installed behind the rear panel on the underside of the seat.



6–22

REPLACEMENT (ALL MODULES)

– Switch the vehicle off.

– Remove the battery fuse from the fuse holder.

– Unlock all plugs and pull them off of the module that is to be replaced. – To unlock the locking levers press them down on the opposite side of the module.

– Disassemble the module and mount the replacement module.

– Plug all plugs back into the new module.

☞ **Note:**
Most of the plugs are secured against interchange. In case of doubt follow the cables back. All sockets on the modules are labelled (also view the images for plug assignment in the corresponding chapters).

– Replace the battery fuse and switch the vehicle on.

☞ **Note:**
When error messages occur check all plugged connections for correct allocation and faultless fit. Otherwise view chapter < *CAN-Bus error list* >.

CHECKING THE CABLE LAYOUT

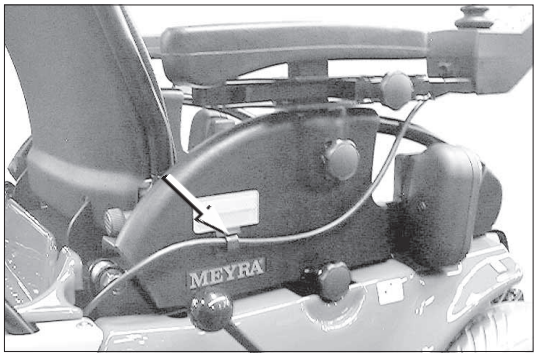
After replacing the operating module and during maintenance the correct layout of the cables of the supply lines to the operating module is to be checked:

– Anatomically shaped seat unit: Layout of the cables and attachment to the armrest receptacles with glued brackets as in fig. 6–23 to 6–24.

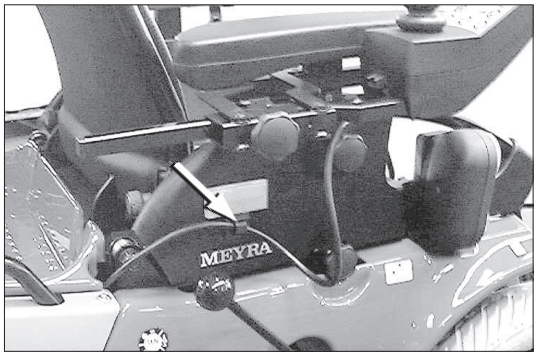
– Anatomically shaped seat unit (Recaro): Layout of the cables and attachment to the armrest receptacles with glued brackets as in fig. 6–25.

Attention:

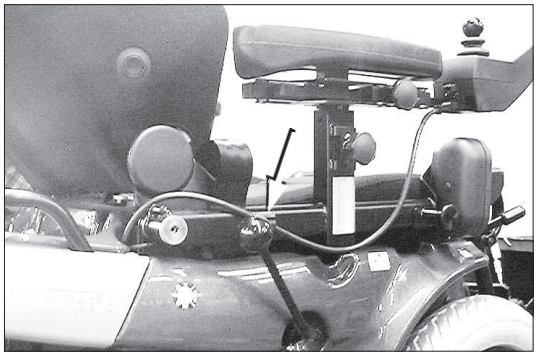
! a) The operating module must be completely swerved to the front (view fig. 6–23) and back (view fig. 6–24) and the adjustment tube maximally extractable without any tension on the cable.
b) The cable may not exceed the contour of the vehicle.



6–23



6–24



6–25

LIGHTING

The lighting equipment is compulsory when participating in traffic and must be checked for functioning at regular intervals. It is fed by 24V.

REPLACING LIGHTBULBS

(On all lighting components)

– Dismantle the dispersion plate (fig. 7–1/ A) of the affected lighting component. – To achieve this unscrew the attachment screw(s) and remove the dispersion plate.

– Replace the defective light bulb.

Attention:

! Watch for the correct voltage (24V) of the replacement light bulb!

The light bulbs used are (view fig. 7–1)

(B) headlight: 24V/3W E10, screw thread
(C) front turning signal: 24V/10W BA15s, bayonet mount
(D) rear turning signal: 24V/21W BA 15s, bayonet mount
(E) taillight: 24V/C5W S8,5, festoon bulb

– Remount the dispersion plate.

ADJUSTING THE HEADLIGHTS

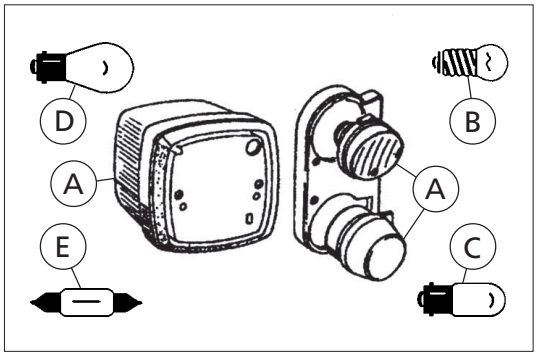
☞ **Note:**
The adjustment is to be done on both headlights. – Therefore place the vehicle on level ground.

– Loosen the upper (fig. 7–2/ F) and lower fixation screws (fig. 7–2/ G) for the housing of the lighting component.

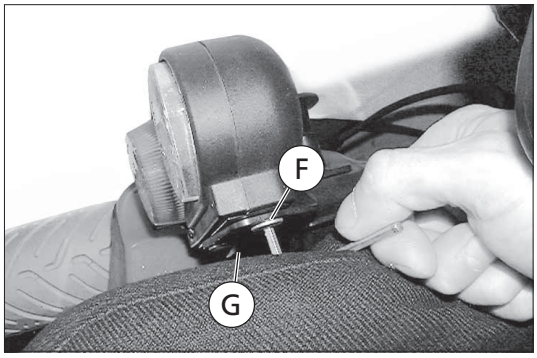
– Adjust the headlights by turning the housing of the lighting component (Moving the fixation screws in the slotted holes).

– The headlights are adjusted correctly when the lower edge of the cone of light reaches the ground about 3 meters in front of the vehicle.

– Retighten the fixation screws.



7–1



7–2

BATTERIES

CHARGE

Attention:

! Deep discharge and frequent partial discharge, without immediate recharging, quickly leads to capacity loss. – After disassembly the batteries are therefore immediately to be charged (fig. 8–1). Especially before a longer storage the batteries are to be completely charged and because of the constant own discharge to be recharged in-between.

Marginally increased transition resistance (starting at 0.2 Ohm) in the charging cables and -plugs already prevent a complete charging. Plugs that become hot during charging are to be replaced.

BATTERY CHARGERS

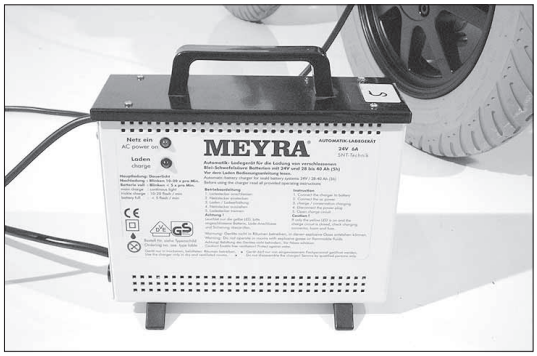
For determination the chargers have different coloured lids (fig. 8–2):

– White lid: 8 A, for more than 40- to 60-Ah-batteries, e.g. for Sprint GT and Optimus

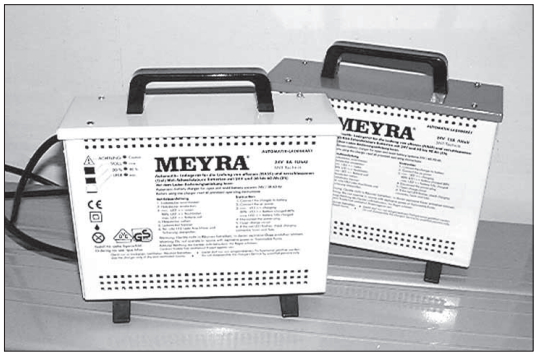
– Red lid: 12 A, for more than 60- to 90-Ah-batteries, for Optimus

☞ **Note:**
(On the Optimus:) When changing from 60-Ah- to 75- resp. 90-Ah-batteries use the 12-A-charger, so that - especially when driving a lot - the charging cycles remain limited and the batteries are fully charged.

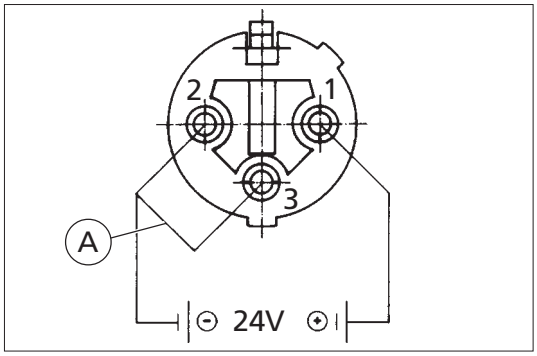
☞ **Note:**
When replacing the plug (Part-No. 206 917 100) a bridge (view inner view of the plug, Fig.8-3/ A) must be soldered between the contacts 2 (mass) and 3, so that the operation module shows the charging symbol and the driving lock is engaged.



8–1

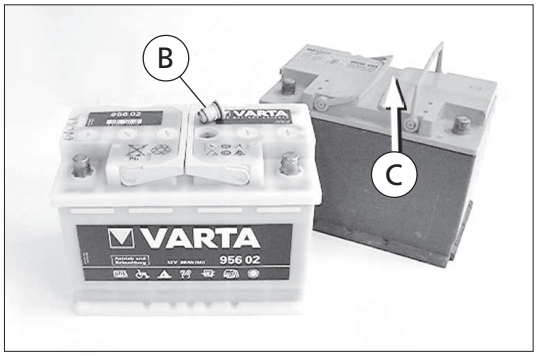


8–2



8–3

TYPES OF BATTERIES



8–4

Liquid batteries (about 150 to 300 charging cycles) are filled with diluted sulphuric acid and have screwed sealing caps (fig. 8–4/ B).

Benefits:

– short charging cycles (complete charge overnight)
– small acquisition costs

Disadvantages:

– not leak proof
– not maintenance free
– susceptible to deep discharge

Fleece bound batteries and gel-batteries (about 400 to 600 charging cycles) cannot leak and have a closed housing (fig. 8–4/ C).

Benefits:

– leak proof
– maintenance free
– less sensitive when deep discharged
– long storage possible without recharging

Disadvantages:

– high acquisition costs
– less km/h-performance with the same Ah-value as acid batteries (view chapter < *technical data* >).

☞ **Note:**
Do not use starter batteries, but only batteries that are declared as driving-, power- or traction-batteries. – Starter batteries are not suitable for transfer of small and middle currents over a longer period of time. Furthermore the maximal capacity sinks very rapidly in starter batteries. Even though the acquisition costs are higher the use of traction batteries is more economical.

☞ **Note:**
When replacing old batteries choose generously dimensioned batteries if possible. – With scarce battery capacity the batteries run risk of being emptied into the damaging area of deep discharge during operation. Only use types supplied by Meyra or those offered as replacement.

MAINTENANCE OF LIQUID BATTERIES

Power batteries that are cyclically strained need to be charged above the gas dimerisation due to the demand for short charging cycles and the necessary acid blending. This means water consumption by water disruption that must be balanced through regular refills. For refilling only use distilled water.

– Charge the batteries completely.

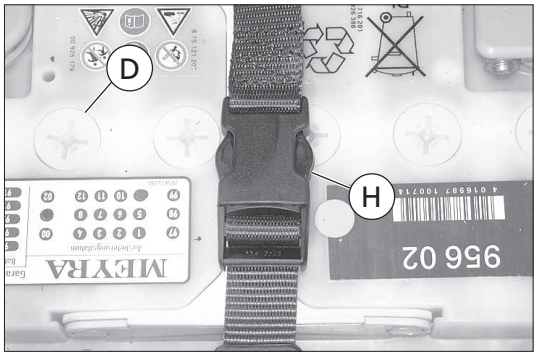
– Screw out all sealing plugs (fig. 8–5/ D).

Attention:

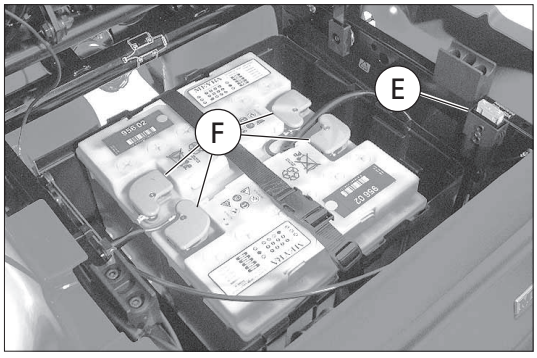
! Battery acid is caustic! In event of acid droplets on the skin, in the eyes or on clothing, rinse immediately under running water. – If necessary place an emergency call!

– Fill up missing acid level with distilled water. The acid level is correct when it is
a) just above the filling hole insert or
b) approx. 5 mm above the top edges of the plates.

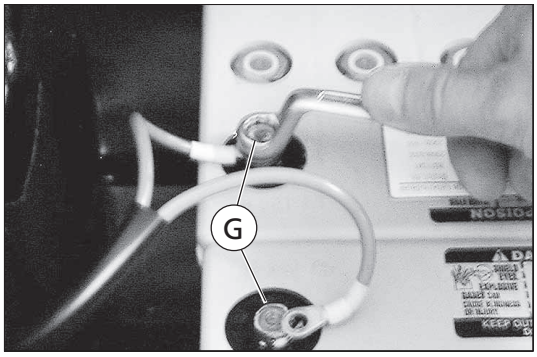
– Replace the sealing plugs.



8–5



8–6



8–7

REPLACEMENT

REMOVAL

– Remove the battery fuse from the fuse holder (fig. 8–6/ E).

– Remove all pole shoe caps (fig. 8–6/ F).

– Screw the four cables (fig. 8–7/ G) off of the battery poles.

– Press the sideward tongues on the clip of the spanning belt (fig. 8–5/ H) together and open the clip.

– Lift the batteries out.

FITTING

The fitting is done analogue in reverse order.

Attention:

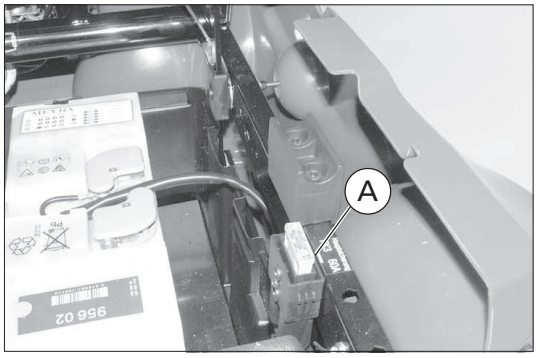
! Replace the pole shoe caps on the battery poles. – Otherwise danger of fire through short circuits!

FUSES

BATTERY FUSE

The battery fuse is switched in line in-between the two batteries.

The battery fuse holder (fig. 9–1/ A) is located underneath the seat, on the left hand side (in driving direction) at the frame.

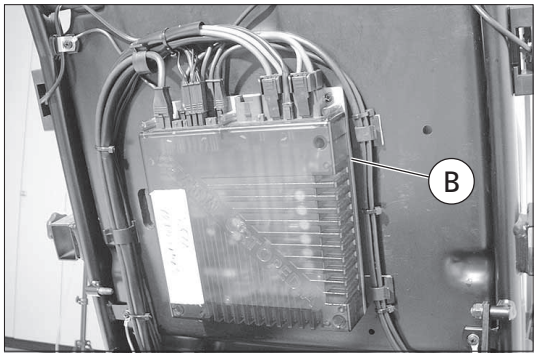


9–1

ELECTRONIC SECURITY

All electrical components (except for the batteries) are electronically protected by the power module (fig. 9–2/ B). The power module also sees to a power limitation of the motors.

In case if a shortage only the defective component is deactivated. All other components (e.g. all other lights except for the defective one) remain available. After removal of the shortage, the affected component is automatically activated again.



9–2

MAINTENANCE

Wheelchairs are medical devices of the class I-MDD. As a medical device they underlie the operator provision and are to be maintained regularly. We recommend at least once a year. The work done and replacement of essential parts is to be documented.

For the documentation in the course of the maintenance the itemised maintenance checklist can be used. The maintenance checklist is designed for duplication through copying. The filled in maintenance checklists are to be added to the documentation.

With the signature the undersigned declares to have duly performed the measured declared in the maintenance checklist.

Designation:	Maintenance/Inspection date:
Vehicle Identification number:	Maintenance/Inspection done by:
Year of construction:	Signature:

Stamp of the executing workshop:

MAINTENANCE CHECKLIST

ELECTRICAL SYSTEM

Batteries

- ❑ No external damage or stains on the batteries?
- ❑ Attachment cables tight on the battery contacts?
- ❑ Poles and attachment clamps cleaned and greased with Vaseline or Acid protector grease?
- ❑ Operation capability of the batteries ensured (capacity check)?
- ❑ Spanning belts for the attachment of the batteries undamaged and tightened correctly?
- ❑ With liquid batteries: Acid level checked (view chapter < *maintenance of liquid batteries* >)?

Electrical conduits and alignment

- ❑ Steering-, battery- and motor-cable
  a) undamaged?
  b) layed out stress relieved and without jamming points (view chapter < *replacement of the CAN-Bus-modules/checking the cable layout* >)?
- ❑ Plugged connectors undamaged and not corroded?
- ❑ Are the cables to the lighting units and sensors undamaged and attached correctly?

CAN-Bus Control

- ❑ Keys on the operation module work bounce-free?
- ❑ Controlling display functions?
- ❑ Keyboard foil undamaged and tightly glued?
- ❑ Key-lock function flawless?
- ❑ Joystick functions easily and returns from arbitrary drooping back into the home position?

Lighting

- ❑ Do all components of the lighting equipment function?
- ❑ Dispersion plates and bulbs undamaged?
- ❑ Headlights adjusted correctly?
- ❑ Passive lighting (reflectors on the rear and sides) complete and undamaged?

MAINTENANCE CHECKLIST

Driving behavior

- ❑ Test drive done?
- ❑ Personal barriers of the user regarded during the adjustment of the driving features?
- ❑ Variation from the adjusted maximum speed not more than +/- 10% on level surface?
- ❑ Vehicle drives straight with straight setting of the joystick?
- ❑ Level at which no driving impulse is given (Zero-zone), for forward and backward motion identical?
- ❑ When steering into curves automatic speed reduction of the set speed?
- ❑ Working angle of the reduction automatic the same left and right?

Braking behaviour

- ❑ Braking distance after releasing the drive impulse lever at max. speed and loaded with the max. permitted weight is achieved (1 m braking distance at 6 km/h, 2 m braking distance at 10 km/h)?
- ❑ Magnetic brake holds the max permitted loaded vehicle safely on the permitted incline (Values view type plate)?
- ❑ The magnetic brake engages about one second after releasing the drive impulse lever?
- ❑ With selected push mode no driving function reacts?

MECHANIC

Seat

- ❑ Seat lock engages flawlessly?
- ❑ Armrests attached correctly (Torque according to table)?

Frame/Coachwork

- ❑ Frame parts/coachwork do not show signs of deformation or fractures?
- ❑ Panels are screwed on at each available attachment point?

MAINTENANCE CHECKLIST

Tyres and rims

- ❑ Tread pattern depth of the tyres is greater than 1.5 mm?
- ❑ Tyres free of damages or foreign bodies and not brittle?
- ❑ Air pressure front and rear 2.5 bar?
- ❑ Hubs do not show tears or raptures?
- ❑ Hubs without axial run out of more than 2 mm?
- ❑ Wheel attachment screws tightened with the value indicated in the table?
- ❑ Wheel with the magnet for the speed sensor is mounted to the right side?

Chassis

- ❑ Screws with which the drive is attached to the vehicle tightened to the value in the table?

DIN NORMS AND GUIDELINES

The torque according to DIN for screwed connections can be extracted from the table at the side.

Tyres

Filling pressure front: ..... 2.5 bar
Filling pressure rear: ..... 2.5 bar
Minimal profile depth acc. to STVO: ... 1.5 mm

Table: Torque according to DIN for screwed connections

Thread diameter	Tightening torque
M 4	3 Nm
M 5	5 Nm
M 6	10 Nm
M 8	25 Nm
M 10	50 Nm
M 12	85 Nm

MEYRA®
The Motivation.

MEYRA • Wilhelm Meyer GmbH & Co. KG
Company address: Meyra-Ring 2
D-32689 Kalletal-Kalldorf

Telephone: +49 (0) 5733 922-311
Telefax: +49 (0) 5733 922-143
e-mail: info@meyra.de
Internet: http://www.meyra.de

Postal address:
Postfach 1703 • D-32591 Vlotho

NOTES

Stamp of the authorized dealer:

MEYRA®
The Motivation.

MEYRA • Wilhelm Meyer GmbH & Co. KG
Company address: Meyra-Ring 2
D-32689 Kalletal-Kalldorf

Telephone: +49 (0) 5733 922-311
Telefax: +49 (0) 5733 922-143
e-mail: info@meyra.de
Internet: http://www.meyra.de

Postal address:
Postfach 1703 • D-32591 Vlotho

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